What's in This Issue

Fred H. Rohr, superintendent, Ryan Aeronautical Company, beside one of the drop hammers he has adapted to the aircraft industry

Blocking up a die so that no accident will occur when it is being set up and checked is important in the press shop. How Ford does it is told on page 727.

Are you acquainted with the term "**superfinished surfaces?**" Maybe not, but you will be hearing a lot about it from now on. "Superfinishing" is a Chrysler development. Examples of what it does are described on page 722. There are plenty of good pictures, too.

Do you know how to **select the right press for a specified job?** Don't be too sure until you have read C. W. Hinman's appraisal of various types of presses. It is on page 726 and is a part of a notable series of articles on press working of metals.

"Come South," say Southerners to industry. Just **why the South is drawing industry** away from other parts of the country is told on page 711.

At the Capitol in Washington is the **world's largest plant for comfort cooling of air.** Making equipment for this plant was a man-sized job at York Ice Machinery Corporation. Shop operations are shown on page 712.

Exit the oil can as new types of lubricating systems come in. Nathan Manufacturing Company makes a four-way oil distributor for lubricating locomotive bearings. Production of this distributor is no cinch. The **machining of the castings, with the problems involved and how they were solved,** is shown on page 718.

Unless you're pretty dumb, you have heard of a metallurgist. **But did you ever hear of a MENTALlurgist?** Dad says that every factory should have one. You can find out about mentallurgists on page 721.

Believe it or not, Ryan's latest three-place cabin **monoplane is stamped out almost completely on the drop hammer.** Using this method, Ryan can build planes in lots of a few hundred with material reduction in cost over any other method available. Fred H. Rohr, factory superintendent, tells you the story of Ryan's methods on page 714.

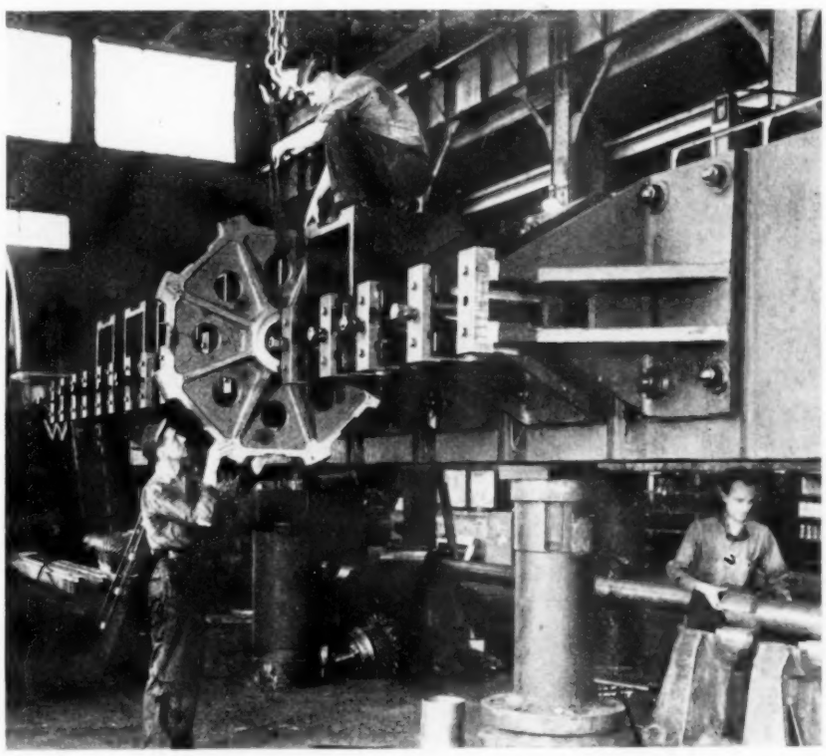
If you want to know the **status of the metal-working business** in these August dog-days, turn to page 710d and you'll find out in three-minutes' reading time.

COMING

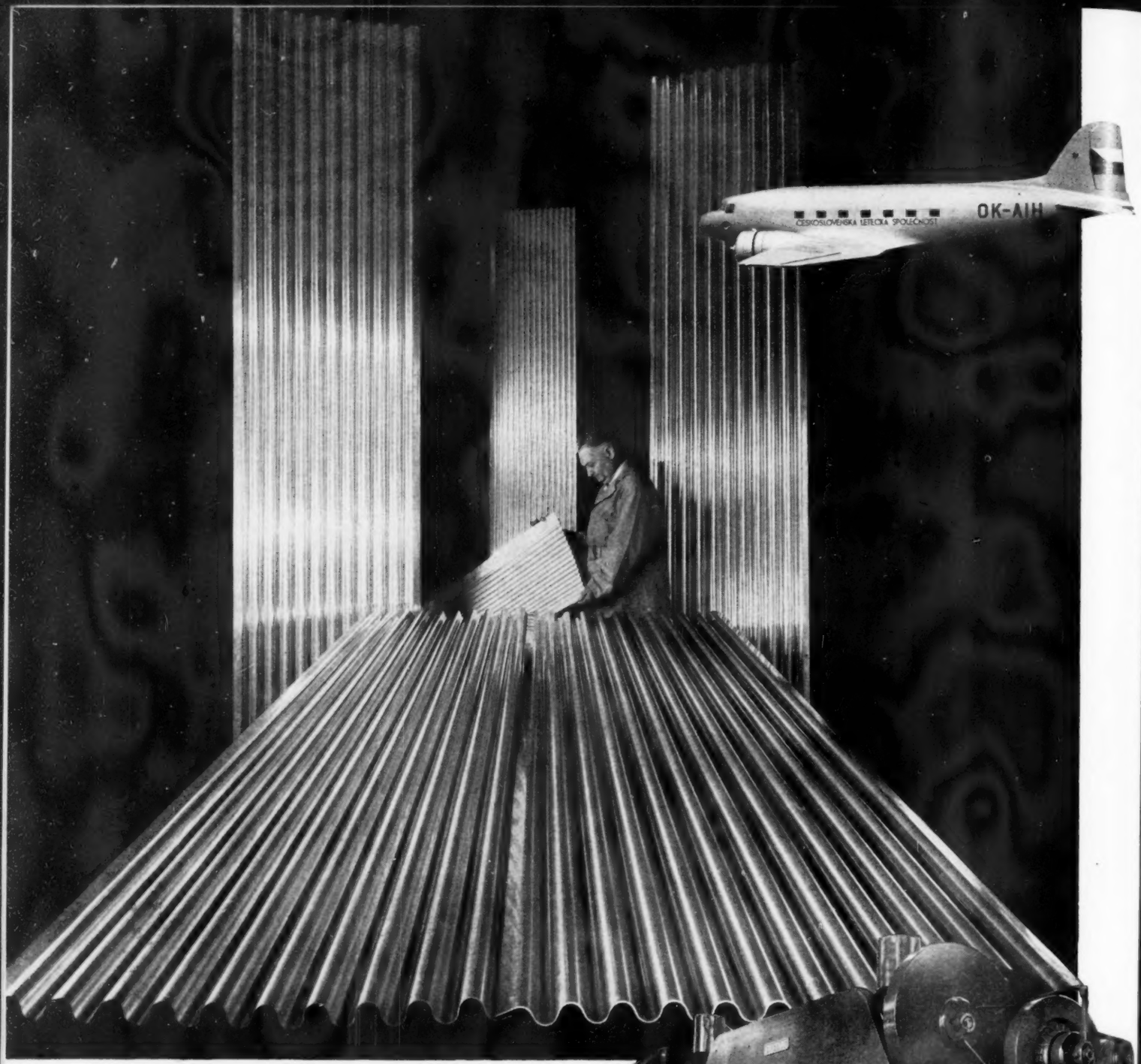
Who inspects the inspectors? In most plants, nobody. But aptitude studies have shown that the use of simple tests will give a good index to the qualifications of an individual to pass on the plant's products. Read Charles A. Drake's account of his method in the next number.

Precision-rolled sheet and strip steels have brought major changes in producing mills. Mesta's part in designing and building the massive equipment used by many mills will be discussed in an early number.

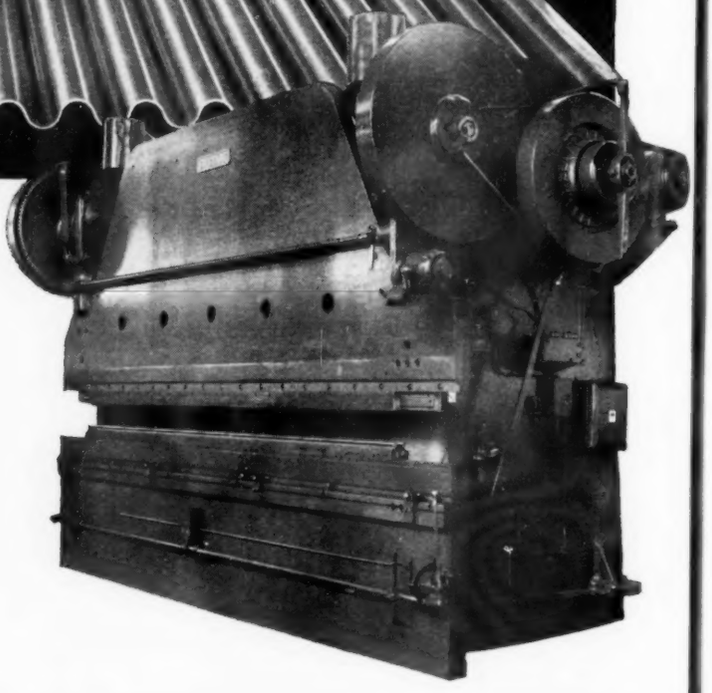
Rear Admiral Emory S. Land, head of the U. S. Maritime Commission, will tell how obsolescence in the merchant marine will be cured.



A hot sheet piler is set up in a Mesta continuous mill



16′ sheets for modern transport planes, formed on a 340 Series Cincinnati All-Steel Press Brake.



FOR the Wings of Man . . . aluminum alloy sheets must be accurately corrugated . . . a job typical of the machine tool accuracy of Cincinnati Press Brakes . . .

THE CINCINNATI SHAPER COMPANY

CINCINNATI, OHIO

AMERICAN MACHINIST

ESTABLISHED 1877

P. H. COLVIN • K. H. CONDIT • BURNHAM FINNEY, Editors

Banish Fortyphobia

FORTYPHOBIA is on the defensive. And rightly so, for it has no place in American industry.

For those who don't know what we are talking about, we explain that fortyphobia is the attitude of mind which causes employers to discriminate against men over forty.

There is no more vicious theory than the one which holds that men have passed their prime or are not worthy of hire when they have reached middle age. Reasons ascribed for fortyphobia are that younger men work faster and can be hired for less. But this is shallow thinking. It is the short cut which isn't safe to follow.

The truth is that for many types of work, the man of mature judgment is needed badly. He is a stabilizing factor in the shop. He can help train the younger men. On many jobs he can do the work better than the younger man.

It is the men in the "stout-waist-line" age class, then, who are industry's front-line workers when it comes to skill, experience, loyalty and just plain horse sense. We recall the case of the Middle Western metal-working plant where young men, mostly in the twenties, were predominant. The plant manager was not long in discovering his error. These youngsters were ready to start trouble at the drop of a hat. Most of them had never had a job before out in industry. They had been raised on the W.P.A. and their job performance was a sorry record. In self-defense the manager who thought he was very bright when he filled his shop with youngsters had to replace most of them with older men. The shop's efficiency has improved materially since the change.

Let's look at the matter from a cold financial viewpoint. The man of forty or over usually has more family obligations than the man ten or twenty years younger. If he is thrown out of a job through no fault of his own and he is boycotted, what happens? He and his family are forced onto the government relief rolls. That means that the manufacturer who perhaps discriminated against him because of his age must contribute anyway to his support. Is the manufacturer any farther ahead then? We think not.

WE WELCOME the awakening of industry and of the people to the peril of making the man past forty an outcast. We commend the effort of such alert organizations as the Sales Executives Club of New York to see that older employees get their just rewards. The large number of manufacturers who have been conscious of the importance of older workers also deserve praise.

In the rush to do justice to the older worker, however, industry must not discriminate against the younger man. It would be just as bad to let the man of twenty-five feel that he was barred from a job because of his age as it would the man of forty-five. A fair and just way to handle employment is to have a working force represent a cross-section of the community so far as age is concerned. The Ford Motor Company has done that for years with eminent success.

Industry should not be satisfied, however, until it can provide jobs for old and young alike. Perhaps it is an unattainable ideal for industry to be able to supply work to all employable people, but surely it is an ideal worth working toward.

Gaging Business

WITH some companies reporting a contra-seasonal rise in sales during July and with almost all districts having experienced an expansion in inquiries, the metal-working industry is expecting an early Fall upturn. Steel operations are steadily forging ahead with the ingot rate this week at 39.4 per cent. Motor car companies have sold more 1938 cars than anticipated and will start the 1939 season earlier than planned. First assemblies will be under way this month. Machinery makers are receiving substantial orders from foreign buyers and a slight improvement noted in domestic business.

The Federal Government, particularly the army and navy, will be an important purchaser of machine tools the remainder of this year. In fact, orders for metal-working equipment placed by the government in the last two weeks have been fairly large. Construction work is gaining over the comparable period a year ago. Shipbuilding companies are on the verge of an important expansion in activities. Farm implement makers are bogged down in a summer slump, but have increased output slightly. Business Week's Index of Business Activity is at 60.9 as against 61.6 a month ago.

CHICAGO—July sales in several lines were contra-seasonally good, comparing favorably with the June volume. Steel mills have benefited from a slow but steady gain in orders. They continue mainly dependent on bookings from the construction field and from miscellaneous sources. A large maker of industrial equipment reports July the best month since last November, and an important diesel engine builder had a better month in July than in June. Some machine tool dealers have been pleasantly surprised by an increase in orders. Thanks to two large government contracts, Fairbanks Morse has stepped up operations. Rockford machinery companies are doing fairly well, but are finding it difficult to keep backlogs from dwindling. Milwaukee appears less optimistic than other cities in this district. Farm implement output on a meager basis.

BOSTON—Machine tool sales and inquiries are better. Army and navy projects are still in preliminary stages, but proposed programs call for substantial equipment buying. Unfilled orders by dealers have declined. Industrial sentiment is more buoyant. General Electric has received a $712,000 naval gear order requiring machinery purchases and an extension to its Lynn plant. Public building work is increasing rapidly. Substantial orders for materials and supplies were set in motion by recent localized floods.

CLEVELAND—Things are gradually mending, with many companies expecting to call back employees and lengthen hours somewhat this month. Steel operations are up slightly. Machine tool orders continue to drag.

PITTSBURGH—Continuing an upward movement which began early in July, steel operations have reached 40 per cent and are still rising. Most support comes from miscellaneous users, big buyers being conspicuously absent. Some companies are building stocks in anticipation of early fall orders. Machinery inquiries are more numerous.

CINCINNATI—Foreign business is the chief support of the machine tool market. Russia and Japan have supplied most of the current bookings. Domestic machinery orders have turned upward because of government awards. The outlook for sales to industrial companies is not good.

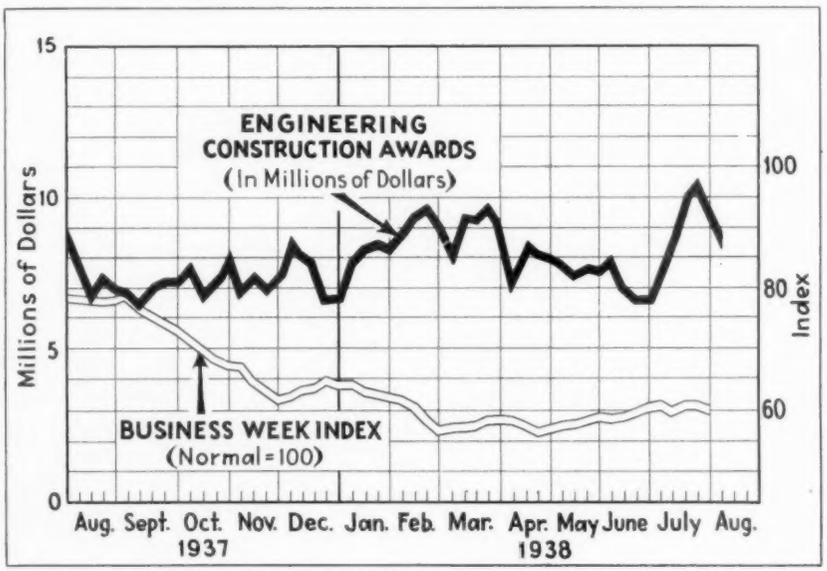
DETROIT—Machine tool inquiries are good. Small tools and supplies are being bought. Some smaller parts plants have received business which will keep them occupied for three to six months. Industrial employment at Toledo is up a bit, and considerable machinery sales are in prospect.

NEW YORK—Government orders totaling around $100,000 have been awarded New England machinery builders. The army and navy have placed other important orders with metal-working companies here.

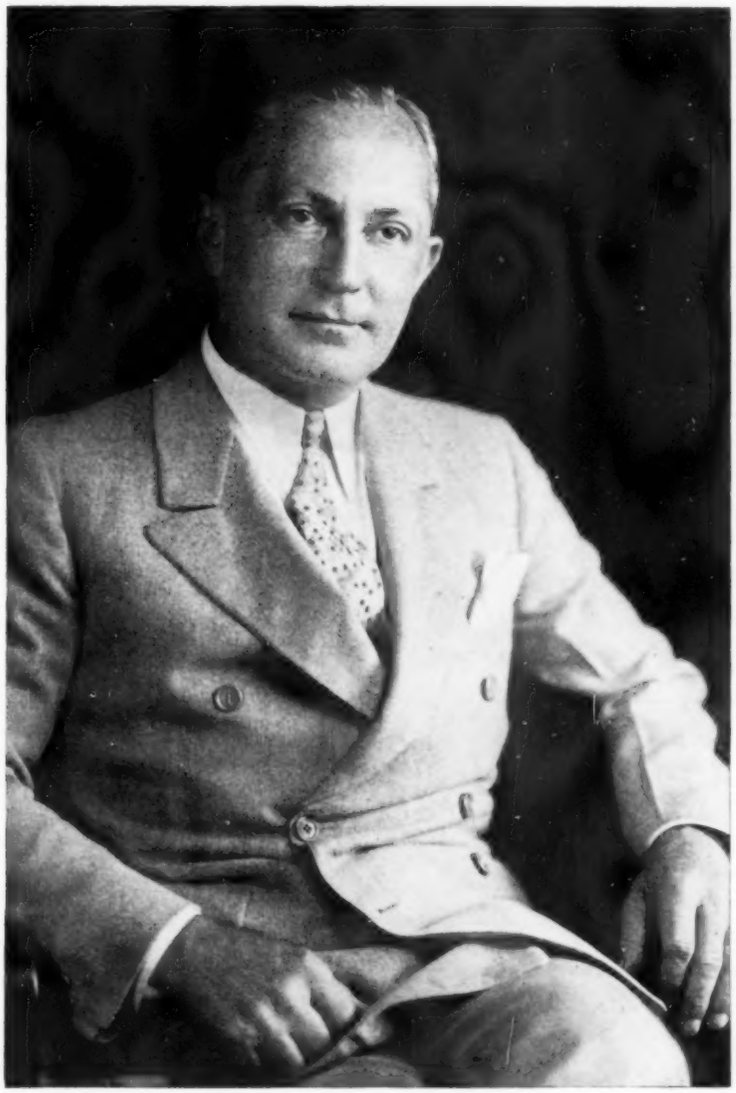
SAN FRANCISCO—Brightest spot is the all-time record in far western construction awards in July totaling $64,193,000. That amount included $36,000,000 for Shasta Dam, but still was $4,000,000 more than the monthly figure when Boulder Dam was contracted for. Industrial indices showed a slight upturn toward the end of July.

CONSTRUCTION AWARDS VS. GENERAL BUSINESS

Despite a sharp drop, construction awards are well above their average for the past year, while business manages to hold its summer gain



Industry Looks South



LAWRENCE WOOD ROBERT, JR.
Executive Director
Southeastern Governors' Conference

IF YOU are an executive of an industrial organization seeking a location for plant expansion it will pay you to consider advantages offered by the southeastern tier of states.

It is now accepted that concentration of an industry in a given section of the country is not necessary to success. Decentralization is under way. Industries that have turned to the Southeast in this move have proved the soundness of the reasons for their decisions.

Back of the great trek southward led by the process industries is the favorable climate of the section. It is a climate that makes possible better living standards at lower living costs for both labor and management.

Labor is native born, intelligent, quick to learn, loyal and thoroughly American in its ideals. Skilled labor for the metal-working industry is already available.

Power rates are generally low, and fuels are abundant and reasonable. Coal, coke, natural and by-product gas, fuel oil are available. Transportation facilities are adequate.

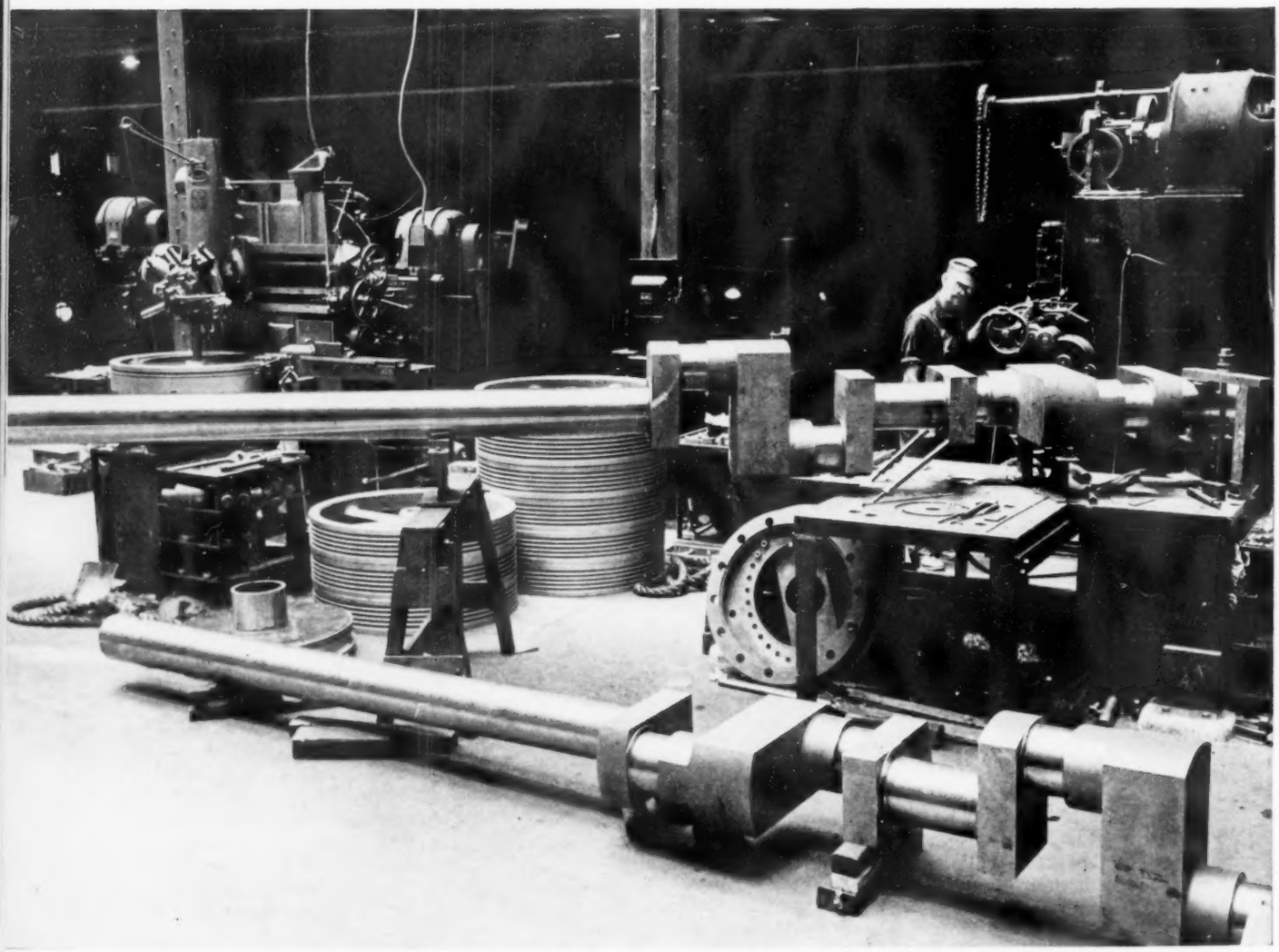
The southern market for the products and services of the metal working industry has been considerably enlarged by the rapid expansion of the pulp and paper, chemical and oil industries, to mention but a few. Where these plants have been established in places remote from the industrial centers of the South they have found it necessary to install machine repair shops of their own.

Raw materials for the metal-working industry are at hand in the Birmingham area, except for certain alloy steels and some of the non-ferrous alloys. Abolition of the Pittsburgh price base for steel products will help buyers in the South.

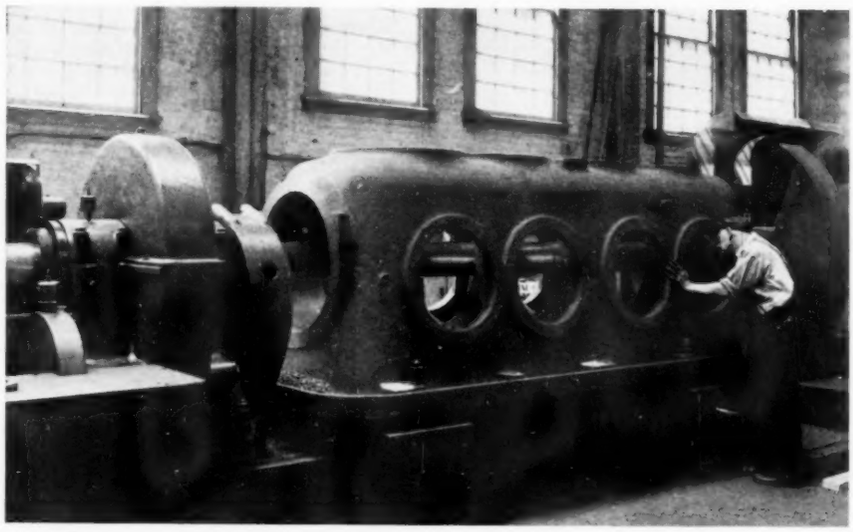
Taxation is reasonable, and there is little disposition on the part of local or state governments to burden industry with unfair or unjust taxes. Over and above this, there will be found a spirit of helpful cooperation, not only on the part of the community where new plant operations are installed, but by the Southeastern Governor's Conference, organized by executives of the several states to aid in the problems of industry. We invite you to look south.

Twin cylinder castings are bored on a horizontal machine. Cylinders are 22 in. bore for a 16-in. stroke. They are finished by honing

To Keep the Capitol



Crankshafts are angle drilled to provide pressure-feed oil holes to the crankpin bearings



The crankcase for one of the Freon compressors is machined on a horizontal mill. The operation illustrated is finish boring the crankshaft head supports

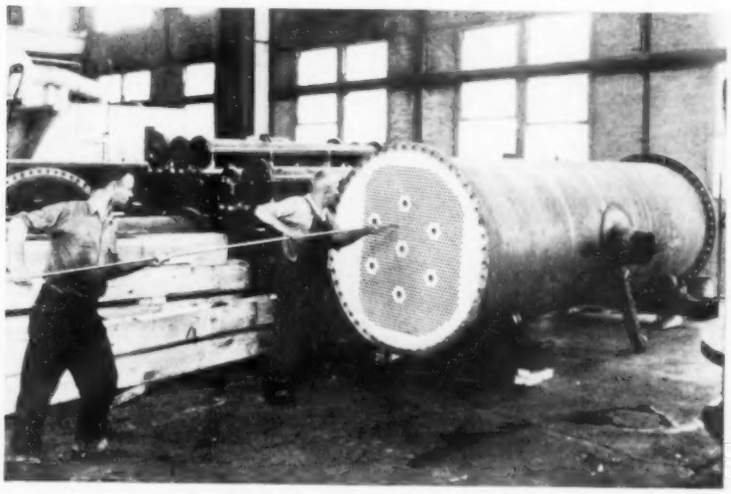
Cool

COOL BODIES foster cool minds. If this be true the Capitol air-conditioning system recently installed by the York Ice Machinery Corporation should have a salutary influence on future U. S. legislation.

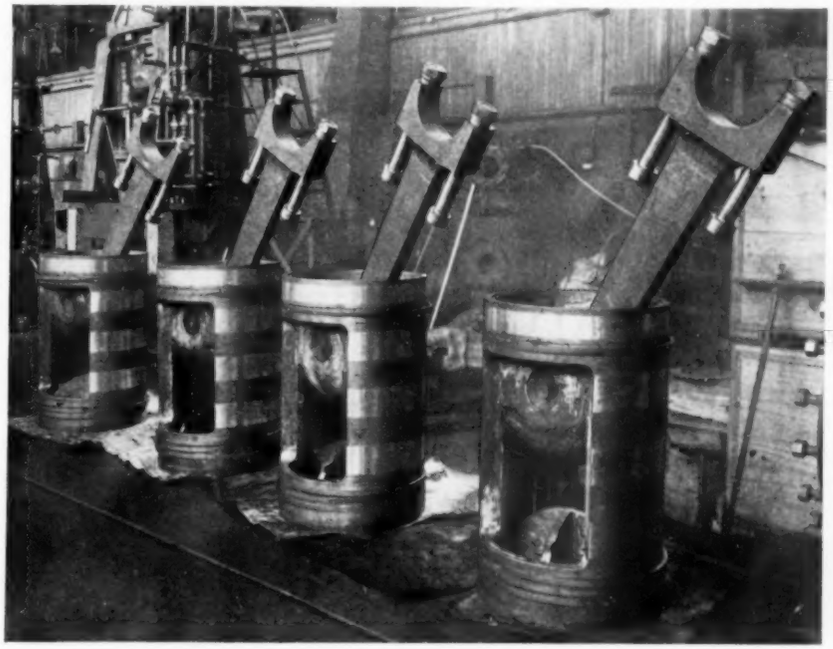
Consolidating older installations, dating back to 1933, the new system represents the world's largest plant for comfort cooling. The refrigerating capacity may be described as the melting in 24 hours of a 50x50 ft. block of ice, seven stories high. So compact is the equipment for doing this work that it takes less space than the equivalent column of ice. It would take 200,000 domestic refrigerators to provide the same cooling capacity.

Four buildings are conditioned by this plant: Capitol, the old and new House Office Buildings, and the Senate Office Building. Driven by six 100-hp. compressor motors the installation will cool over 11,000,000 gal. of water daily. The 8,000-ton compressors chill water to 40 F. to be circulated by pumps through individual finned-coil units.

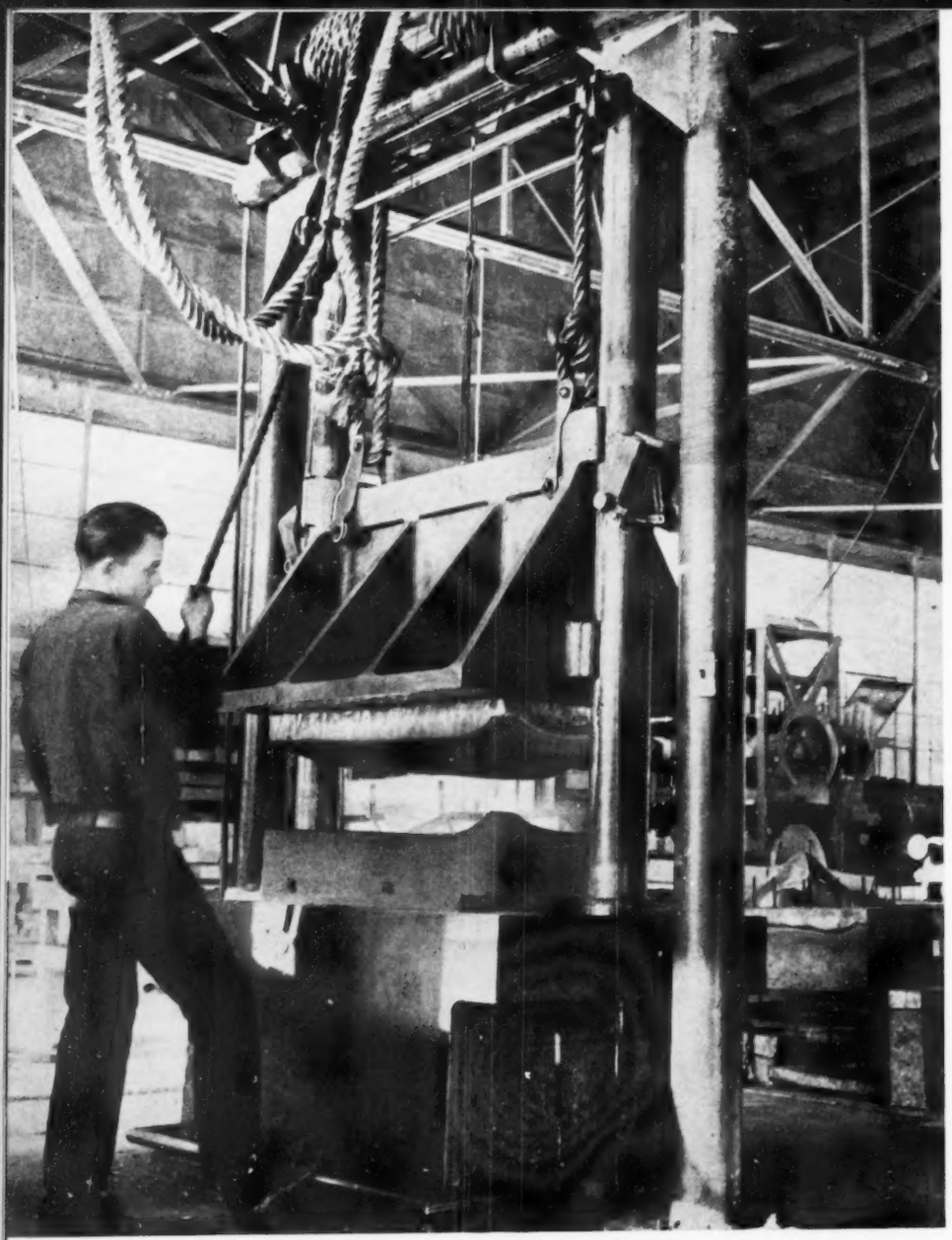
Despite the size of the project the entire production and assembly of the equipment was done at the York shops. Some views of the shop operations are shown here.



Admiralty metal tubes are inserted in 57-in. x 16-ft. welded metal water coolers. Ends are rolled tight in accurately drilled heads. After assembly, the heads are sprayed with bronze for protection against rust



These four 22-in. pistons go into one of the 1,000-hp. compressors. Babbit is applied to the bearing surfaces by rough turning, shot blasting and the Metalayer process. So fast is the bond that the babbit will withstand hammer blows



Ryan drop hammers are actuated by double power ropes fed from a storage coil and operated by a single drop rope. Note the operator's foot on the safety latch control bar

The Drop Hammer Gives Aircraft a Lift

Production of wing and fuselage parts gives new life to an old process and a special technique to meet novel needs

FRED H. ROHR

Factory Superintendent, Ryan Aeronautical Corporation

WHILE the chief metals employed as aircraft structural material are the various popular alloys of aluminum, there is also considerable demand for sheet steel parts, especially in some of the newer stainless steel alloys that are best adapted for use in engine exhaust manifolds, steam boilers for heating systems, etc. The trend towards complete streamlining of all parts, with double curvature fillets and large double curvature sheets for fuselage covering has greatly complicated the problem of developing satisfactory methods of sheet metal forming.

The common way of forming sheet-metal parts when they first came into wide use in aircraft manufacture was by hand bumping. Some factories required dozens of skilled men to pound out parts required; such work was slow and expensive. Even with the most skilled workmen on the job the parts were not uniform. However, it has not been possible to adapt to aviation needs the heavy presses so common to automotive and other large-scale production of stamped metal parts, largely because of the relatively high cost of steel dies. Such dies become an economical production tool only when the parts produced from them are numbered by thousands, tens of thousands or millions. In aircraft work we rarely produce more than a few hundred of any one part, and frequently production is measured by dozens. The tooling cost is the controlling item in most production planning.

Prior to my connection with the aircraft industry I had considerable experience with drop-hammer methods. This method of using a free-fall hammer and soft metal dies, has long been used by silver-smiths, novelty manufacturers and metal workers producing architectural forms such as intricate cornice designs. It has long been employed for the production of intricate stampings in relatively light, soft metals when only a few duplicate parts are required. This seemed a likely tool for application to the problems of forming sheet-metal parts for aircraft.

In 1928, while with the Prudden Aircraft Company, I built and placed in operation what is believed to have been the first drop-hammer used in the aircraft industry. To our delight the hammer proved ideal; with lead and zinc dies we were able to form parts of sheet steel as well as of sheet aluminum and duralumin. Subsequently the drop hammer has been widely adopted throughout the aircraft industry. I have personally supervised installations and operation of such equipment in a number of plants, including the Boeing Aircraft Company, Chance Vought Aircraft, United Air Lines, Solar Aircraft Company, and Ryan Aeronautical Company.

At the Ryan shops we have so far perfected the use of the drop hammer in aircraft production that we can

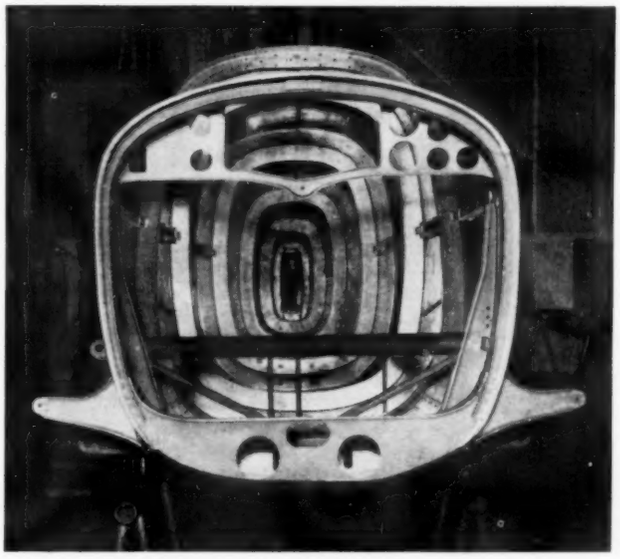
say almost literally that our latest airplane, the model S-C three-place cabin monoplane, is stamped out completely on the drop hammer. This plane is assembled almost entirely of parts formed on the drop hammer, combined with flat sheet material on a portion of the wings and fuselage, and with cloth covering over parts of the wings and tail. By the application of the drop hammer in this case we have produced an airplane which can be built in lots of a few hundred with material reduction in cost over any other method available.

The drop hammer method differs in two essential ways from other methods of sheet-metal forming. First it is a free-fall operation, the hammer dropping on the metal in much the same fashion as a small hand hammer is used. In fact the heart of the drop hammer method is in the "feel" of the work which the operator has as he coaxes a part into or through the die. Some metals spring when formed, and mere pressing will not bring them into the required shape permanently. It often takes the forging action of the drop hammer to give sheet metal the permanent set required to cause it to conform exactly with the shape of the dies.

The second difference is in the action of the hammer on the metal itself. This is primarily an upsetting, compression or shrinking effect, rather than a stretching or "drawing" process as is common with most press-work. In the drop hammer, as we use it, the edges of the work are not restrained and true drawing of the material is, therefore, impossible. Of course, another vital difference is the use of relatively soft zinc and lead dies instead of the steel dies common to heavy duty pressing and stamping operations. Largely because of the above differences we have found it possible to form certain sheet-metal work in a drop hammer which we believe could not have been produced satisfactorily by any other method.

One of the beauties of the drop hammer as an aircraft production tool is its flexibility and adaptability. Although essentially different from the draw press, or the new hydraulic single-die press, which forms the work against a rubber blanket, or blank die, the drop hammer may be used and sometimes is used to do such work. This is easily done by placing heavy rubber mats on top of or beneath the work at certain stages of the forming operation. For drawing, a restriction pad is used to hold the edges of the work, then dropping the hammer on the work more or less as usual. The drop hammer process is adaptable to other special problems of metal forming in a number of interesting ways, making it the answer to a production man's prayer where difficult sheet-metal forming must be done in relatively small quantities.

Drop hammers are essentially crude tools in design and construction and are cheap to build and use, when compared with other types of stamping or pressing equipment. However, work produced from them is by no means crude, but is, on the contrary, of a high order of precision if properly executed. The Ryan factory is equipped with a battery of five drop hammers, all built and installed by ourselves. Recently a number of equipment manufacturers have developed standard drop hammers which may be purchased in a number of types and sizes. The smallest of our hammers has a clear bed measuring 24 by 30 in. (This is, excepting a sixth hammer we built recently, a sort of "watch-makers" model, used for very special purposes.)

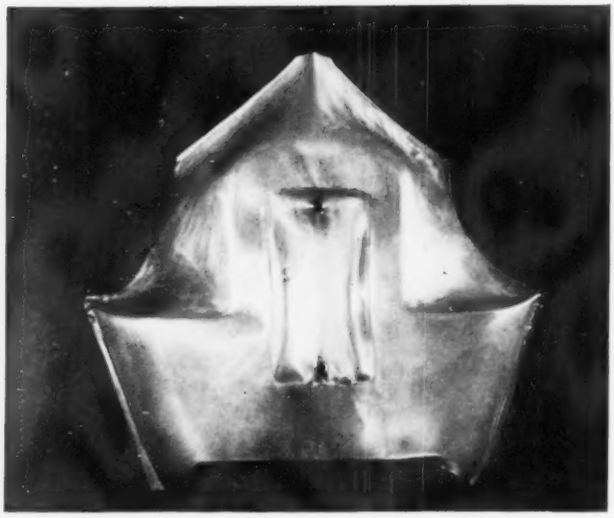


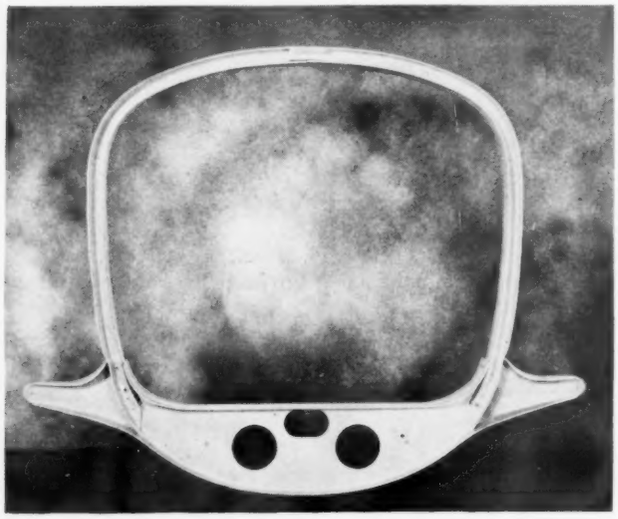
Interior of the fuselage on the Ryan S-C cabin plane shows drop-hammer formed bulkheads

The head, or hammer, weighs 1600 lbs. without the punch die. The base of the hammer weighs 10,000 lbs. It is necessary in the installation of such a hammer to take special pains to absorb the shock of operation on an insulated base so that it will not be transmitted too strongly to other portions of the factory building, offices and engineering department. Customary way of doing this is to use a heavy and homogeneous concrete base on which is mounted a heavy wood pad between the concrete and base, or anvil, of the drop hammer.

Our largest hammer has a clear bed measuring 36 by 48 in. The hammer weighs 3,200 lbs. and carries lead punches weighing up to 6,000 lbs. The base weighs 16,000 lbs. The largest hammer I have yet erected was at the Boeing aircraft factory. This hammer had a bed with clear measurements of 48 by 72 in. The base weighed 17,000 lbs, which was the largest one-piece casting we could obtain at the time. The head weighed 3,600 lbs. It is of interest to note that the head must be a homogeneous mass, rather than a built-up structure. We have found no material as yet superior to a cast iron head. At one time a head was built up of high strength steel plates, carefully welded and heat-treated into a seemingly indestructible one-piece unit. Nevertheless, under the constant impact of hammer work this head soon started cracking in a dozen different places.

Our hammers at the Ryan plant are extremely simple. The hammer head is loosely guided by two tubular steel vertical guide members extending up from the base. The nesting action of the dies is sufficient to produce accuracy of the work, and so we do not highly restrict the hammer head in its movement. The hammer is lifted by means of one or more ropes running over a water-cooled friction drum driven by a suitable electric motor. The drum and motor are supported independently of the hammer base by means of a pair of vertical support members anchored into separate foundations. This construction protects the driving mechanism from the shock of operation of the hammer. Lifting ropes may be varied in size from 1 to 2 in. in diameter. We use





The piece *(left)* formed in one operation measures 3x4 ft. A cabin plane bulkhead *(above)* is shown assembled from six parts formed under the drop hammer. The cowl of a Ryan airplane is an

two ropes for each hammer head, although it is quite common to employ only one. The ropes are wrapped around the power drum from four to eight turns, depending on the individual operator. We feed these lifting ropes out from an overhead storage reel, so that worn portions of rope may be cut off and new rope fed out and attached with minimum delay.

Actual application of snubbing action is accomplished by a single small rope attached to the two power ropes overhead and brought down to the operator. When the operator gives a slight pull on this rope the snubbing action of the power ropes around the drum easily lifts the hammer. It is possible to handle a hammer head in this manner with great ease and finesse, dropping it softly if desired, and gently coaxing the work into the die, or applying the full force of a free drop. In our experience we have found no other type of operating mechanism to be the equal in this respect of the relatively crude rope lift. A safety latch is used to hold the hammer up off the work during the installation of blanks and removal of finished stampings. This catch can only be released after the operator has lifted the hammer head off the latch with the rope lift and cannot possibly be accidentally tripped.

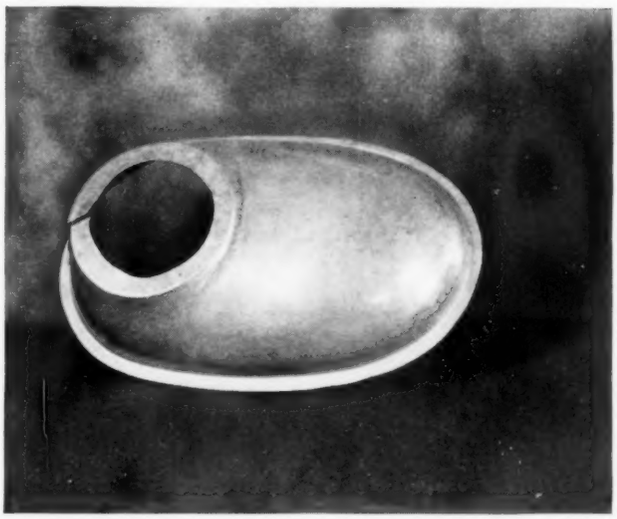
In operating the hammer, a work cycle may be done in one drop of the hammer, or it may require a coaxing process lasting as much as five minutes in extreme cases when using a single-stage die. Or this cycle may be sub-divided on certain types of forming to make use of staged dies which complete the forming operation in a series of from two to eight steps; eight being the greatest number I have had occasion to use. In using staged dies, a greater range of work can be handled as it is possible to work the metal into difficult corners and shapes without producing cracks, strains, or weakened sections caused by thinning out the material. Variation of die forms is almost infinite, making the drop hammer one of the most elastic production tools in the aircraft shop.

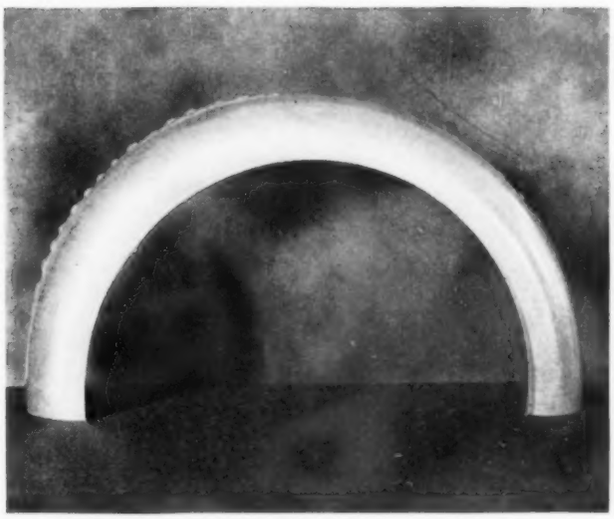
The design, manufacture and use of the dies is vital. In this connection we find that the punch, or movable die, may be either of lead or zinc, and may be either male or female. But in most cases the male die is cast of lead and the female die of zinc, and the male die is usually attached on the movable hammer head and dropped into the female die.

There are many die forms, in some of which dies are of necessity part male and part female, requiring special treatment so that the zinc die shall, if possible, function as a female die. The reason for this is that the lead die becomes relatively fluid under impact, the soft lead punch tending to flow into and exert pressure freely in every direction against the zinc die. This action is of value in producing smoothly finished work, but it also subjects the punch to constant stress and were it not, at the moment of impact, nested within the hard zinc female die it would soon hammer itself out of shape and be worthless. On the contrary, by hammering the lead punch into the hard zinc female die it is reshaped at every blow of the hammer, and so retains its shape without attention over a considerable life. However, after considerable use of the zinc dies—normally ranging from use through 200 to 2,000 forming operations—the pressure of the punch will tend to spread the zinc, necessitating a new zinc casting from the original mold. Usually the original lead die can be reformed directly in the new zinc die.

The molding process for production of the zinc die is commonly done in one of two ways. A sand mold may be made directly from a wood pattern, or much more commonly, a plaster of paris pattern is made by use of templets and molding, or by casting directly against a sculptured form. From this plaster pattern a sand mold is made in which the zinc is cast. The lead die is usually made by pouring lead directly into the zinc die, insuring perfect mating with minimum trouble. This is accomplished by using sand or thin metal to form a dyke around the female die into which the lead is poured. This operation is frequently done with the zinc die in place on the bed of the hammer. Bolts are cast directly into the lead die to hold it against the face of the hammer head. The zinc die is held to the hammer base by pouring lead so as to fill the recess in the base into which the die is bolted. Great care must be taken in handling the metals so that the lead and zinc do not become mixed or contaminated, as they are used over and over. Various zinc alloys have been tried, and a new die-casting alloy is now coming into use to offset the spreading action of the softer zinc alloys. In any case it is possible to use the same metal over again repeatedly, which is a major item of economy.

Working from drawings, and using templets, it is possible to produce a plaster of paris pattern of ideal form at relatively low expense. This pat-





ideal drop hammer part *(above)*. Half of a circular ring *(right)* is formed on a "feeding" die from a flat sheet. Making these parts under the drop hammer results in large savings in die costs

tern can then be stored for repeated use. Another method, first developed here at the Ryan Company, is to mold complete parts of the airplane full size, as in the case of an entire fuselage or engine nacelle. From this master pattern, we then cast plaster of paris sectional patterns which are used to make the sand molds from which our metal dies are made. By this process we are able to insure a perfect fit for all parts of the plane stamped from such dies and so we materially reduce the use and cost of assembly jigs.

When one considers the technique of making the lead and zinc dies, and of finishing stamped parts after removal from the hammer, it becomes apparent that hammering is the smallest part of the drop hammer method. Life of most zinc dies will run to about two thousand stampings. For stamped steel parts we have found "armoring" a desirable trick. This consists of stainless steel inserts on the surface of the lead die at the point where greatest wear is experienced. A light film of lubricating oil is kept on the die surfaces to permit easy "flow" of the metal being formed.

We find it practicable to work sheet dural varying from 0.020 to $\frac{3}{16}$ in. thick, and of stainless steel up to $\frac{1}{8}$ in. thick. At the present time we are working successfully with Inconel having a composition of about 80 nickel, 8 chromium and 12 per cent iron. This material is difficult to work, but it is ideal for use on engine exhaust manifolds, which must be of complex shape. We are forming manifolds of Inconel for aircraft engines of 1500 hp. which could hardly be formed by any other process. In the case of duralumin parts, we heat-treat the finished stamping to obtain the maximum strength of the material and then return the part to the drop hammer and give it one final blow to eliminate any warping induced by heat-treatment.

In finishing stamped parts we use a steel sheet "nesting" jig which is really a stamping made in the same dies as the part. This steel part is carefully finished to exact dimensions and is drilled to serve as a drill jig for the holes to be placed in the finished stamping for riveting and bolting. In production the steel jib is nested over the dural or aluminum stamping and all lines for finish cutting, or points for drill holes, are quickly and accurately marked. We then finish the stamping with a high degree of precision. We find that parts so finished can usually be assembled without use of a jig, as precision has been assured through the accuracy of the nesting jig process.

Engine cowlings of the various models of Ryan metal planes are assembled complete without reference to an assembly jig, and are invariably accurate in finished form. Much the same process is true of assembly of the major portion of the fuselage on our S-T and S-C models. This structure is in the form of a simple truncated cone; a monocoque structure reinforced by lateral bulkhead rings. The flat sheets of the cone are marked from a master steel sheet templet, riveted together into a flexible cone and then built into a rigid structure by addition of the stamped rings which slip into place and line up for riveting and without jigging.

We perform many unique operations with our drop hammers, such as forming and punching a complex new exhaust silencer for aircraft in a fraction of the time and at a fraction of the cost of other methods. We form complete double-curvature rings for cowling by working a metal strip through a "feeder" die. This die represents but a small portion of the finished circle, but with it we are able to complete a ring which would otherwise require spinning. We also bypass the spinning process on our propeller nose spinners, which look like the business end of a torpedo. These are formed by using multiple-staged dies.

On our new Ryan S-C cabin plane we stamp all wing ribs on the drop hammer, many of them in one piece. The flat dural covering of the leading edge of the wing is formed in the drop hammer to increase ease of attachment. The spar cap strips are given their angle form in a drop hammer feeding die and at the attachment point at the wing root these strips are ingeniously stamped to form a "laminated" fitting of several thicknesses of aluminum sheet material which does away with a separate heavy fitting.

Large cabin bulkheads that would usually require numerous parts for stiffening are stamped in one piece on the drop hammer; stiffening is provided by means of corrugations stamped into the one-piece sheet.

The ingenious time and money saving tricks which can be done with a drop hammer are too numerous to mention. I have often illustrated this point by claiming to be able to form a hollow one-piece ball of sheet aluminum, on the drop hammer. No one has ever challenged this claim so I haven't tackled the job as yet but maybe some day I will.

Turret-Lathe Jobs on Oil-Distributor Parts

Manufacturing economy and close tolerances required special tooling for boring four holes, one pair of which was offset with respect to the second pair

FRED H. COLVIN
Editor Emeritus, American Machinist

FORCE-FEED lubrication systems for locomotives must function under many adverse conditions. Such systems involve a mechanical lubricator and an oil-distributor, and the latter must assure positive and uniform delivery of oil to the different bearings regardless of differentials in back pressure. For this reason the Nathan Manufacturing Company must take special pains with the machining of the plunger holes and the fitting of the plungers therein.

Its four-way oil distributor presents an additional problem, however, in that one pair of plunger holes is offset 0.4531 in. with respect to the second pair. Proper tooling had to be secured for indexing the part exactly 90 deg. and also to raise or lower the part 0.4531 in. between each 90 deg. position. This indexing is very important in both directions.

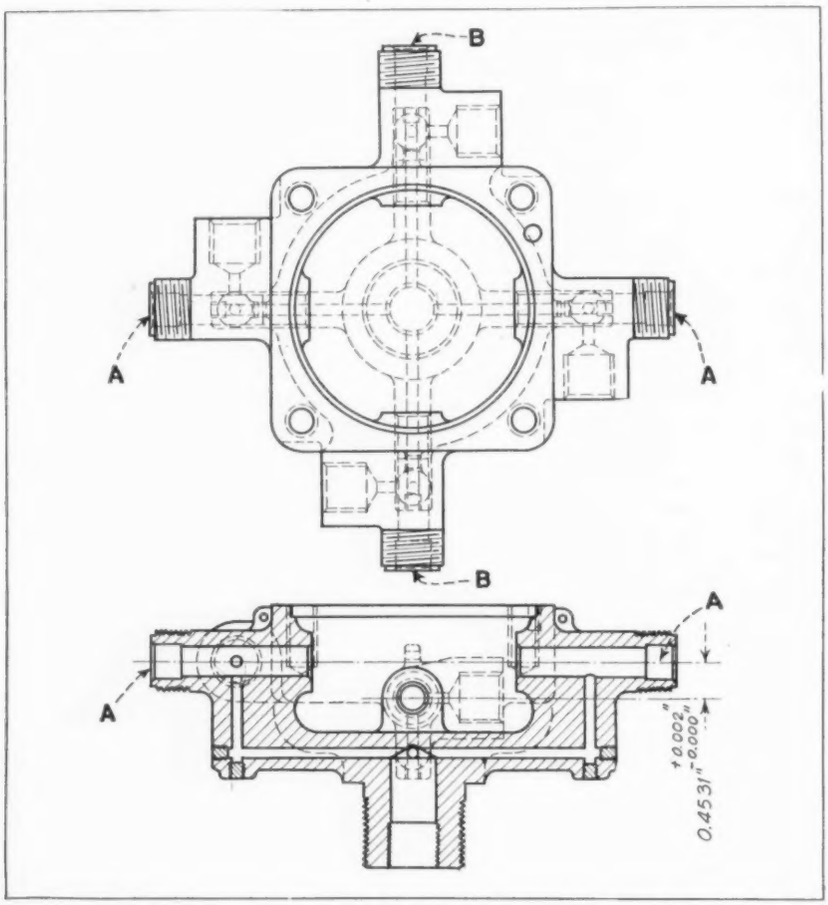


Fig. 1—Four holes, *A-A* and *B-B*, had to be drilled and bored in a single set-up, despite the 0.4531 in. offset between pairs of holes

The first operation, however, is devoted to machining the large hub, or extension, on the back of the cast-iron distributor body, Fig. 1. This hub is drilled, turned and threaded to form the support and inlet from the force-feed lubricator.

The next operation involves the special tooling designed by the Warner & Swasey Company for its turret lathe, shown in Fig. 2. The special chuck holds the distributor for turning and threading the four projections, and particularly for boring the four cross holes in which the plungers operate.

The holes are bored in this operation to 0.360 in. ± 0.001 in. The + 0.001 in. tolerance insures accurate locating of the part in the fixture used for final boring to 0.375 in. in a Bore-matic. These holes must not only be of correct diameter but must really line up with the opposite ones. To add to the difficulty the offset of 0.4531 in. has only a plus tolerance of 0.002 in.

Details of the special chuck, Fig. 3, are as follows: The work piece is located over the pilot of indexing plate *C* and radially against screw *L*. Thumb screw *M* retains the work piece in position. The U-shaped end of removable clamp *H* is slid into the recess on stud *K* and swung around *K* until fully engaged in the T-slot

of part *J*. By tightening *Q*, the work piece is firmly clamped in position, and remains thus until fully machined.

The work piece has two pairs of holes, one pair being offset from the other by 0.453 in. As shown, one pair of holes is on the center line of machine. This position has been determined by placing bushings *D* over locating pins *F* and *G*.

To index the fixture to the second pair of holes, it is only necessary to release clamp screw *A* and shift slide *B* back until the detent pin snaps into place and thereby permits the head of clamp screw *A* to rise when indexing for offset. Then index plate *C* must be lifted and rotated 90 deg. so that bushings *E* are over pins *E* and *G*. It should be noted that the offset is obtained through the difference in height of bushings *D* and *E* as shown on sketch. Before proceeding, clamp screw *A* must be tightened.

When indexing to take care of the offset, the fixture is forced out of balance. To correct this condition the sliding counterweight *T* has been provided. Thus, in order to balance the fixture for the position described above it is necessary to move the weight *T* toward the center. To accomplish this, thumbscrew *R*, which operates a friction binder *S*, must be released and the weight *T* pulled toward center until it stops against the stop pin. This procedure is reversed when returning the fixture to the starting position.

The fixture body *N* is bolted to faceplate *P* and is adjustable for centering on machine.

The four plunger holes are finished by single-point boring on a Heald Bore-matic, using a special fixture as in Fig. 4. This is a particularly difficult job because of the small diameter of the hole. The results obtained by this method have proved so satisfactory, however, that it is being considered for an even smaller hole with a finished diameter of 0.3125 in.

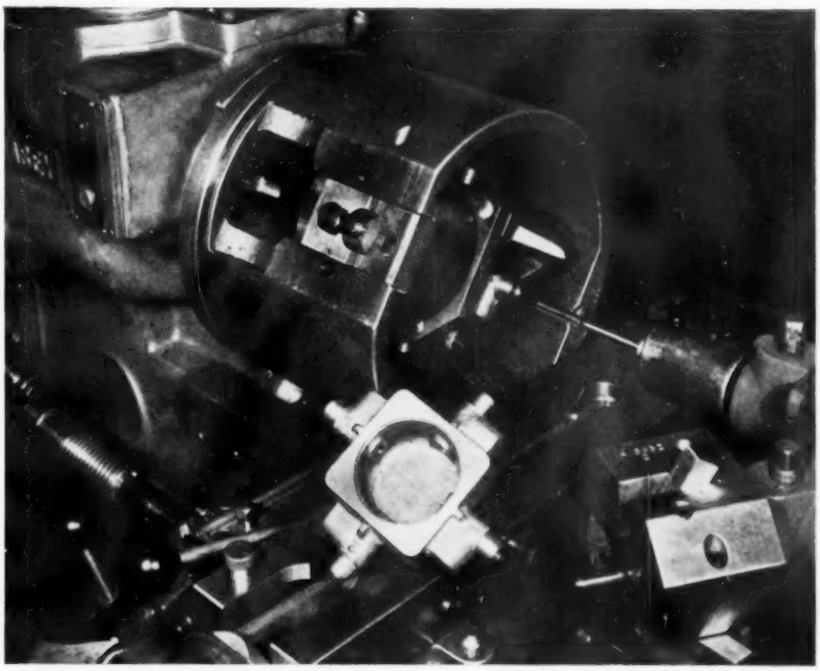


Fig 2—Here is the special chuck set up on a Warner & Swasey turret lathe for turning and threading the four projections, and particularly for boring the four cross holes

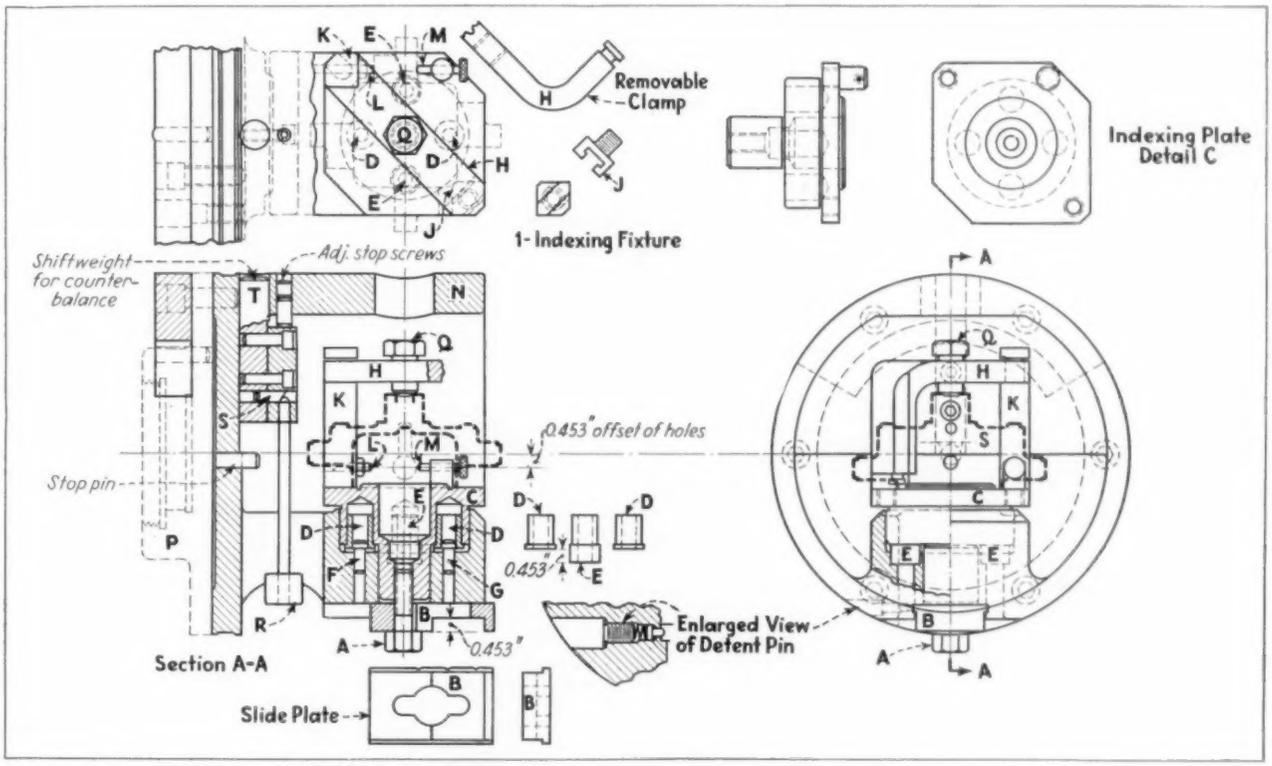


Fig. 3—Slide plate *B* is slotted 0.453 in. deep so that, depending on its sidewise position, the index plate *C* can be raised or lowered to the correct height to bring pairs of cross holes on the lathe's centerline

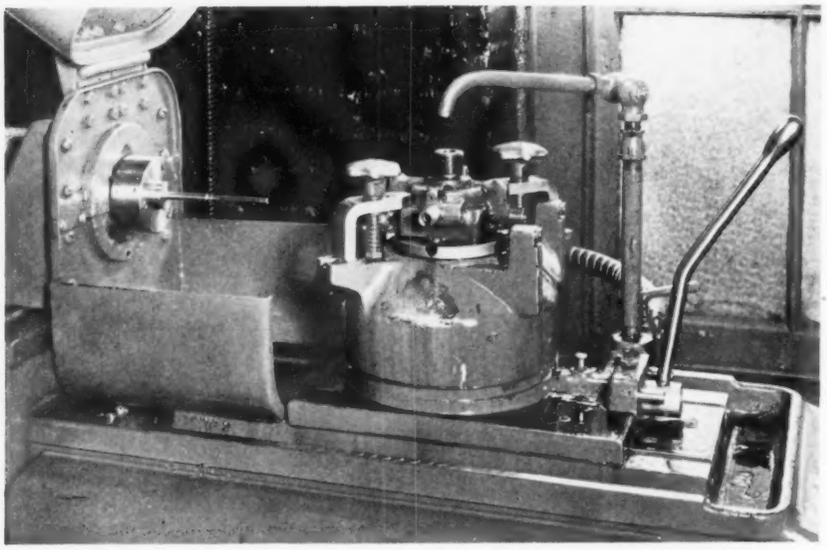


Fig. 4—Finish boring of the cross holes is done on a Bore-Matic using a piloted boring bar with carbide cutter and a special indexing fixture

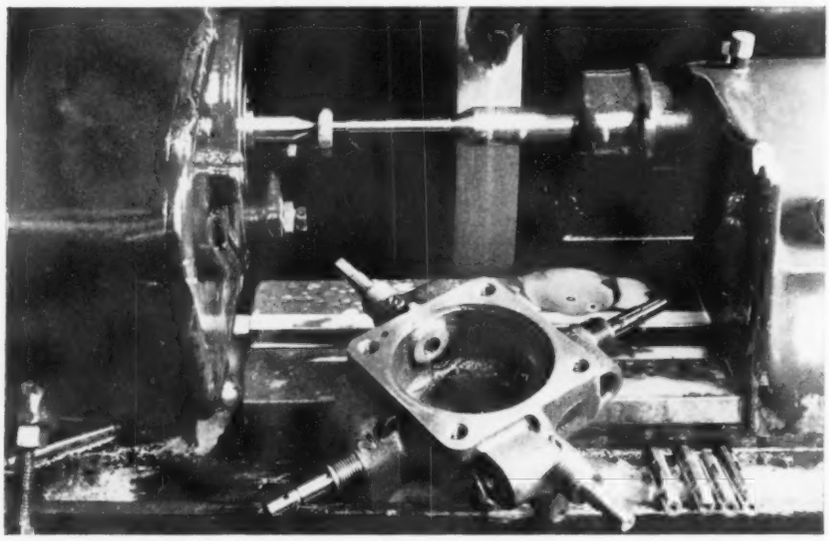


Fig. 5—Plungers for the cross holes are ground in a Landis and then lapped in place after selective assembly

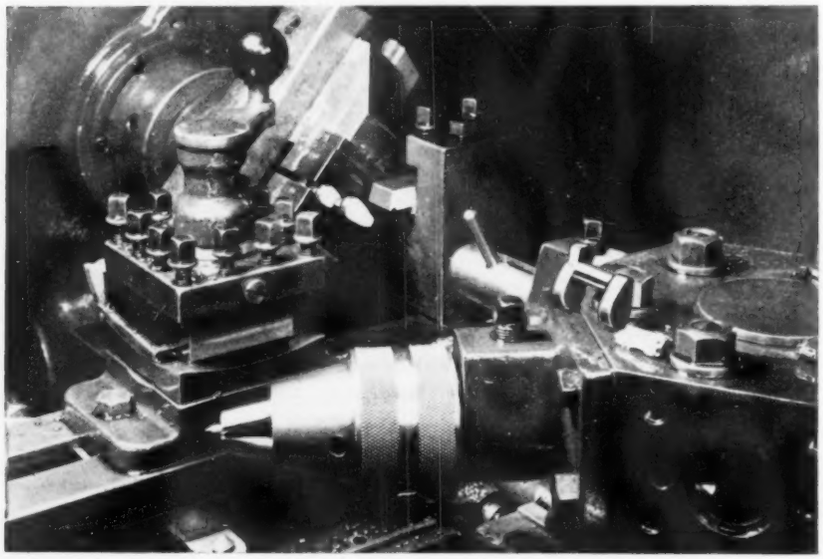


Fig. 6—A forged manganese steel yoke is held by one cheek in a box chuck

As in the previous operation on the turret lathe, the work must be indexed and positioned to secure extremely accurate alignment of the holes. At each indexing, which is done by the handle at the right, the work is turned 90 deg. and also raised or lowered to bring the holes into proper alignment. The fixture was designed and built to exclude chips from the bearings under the chuck.

The boring bar has a tungsten-carbide cutter which does not start into the work until the pilot enters a guide in the center of the fixture inside the body. The alignment of these holes is checked with a ground plug, or rod, that must pass freely through both holes. As this test bar is only 0.001 in. smaller than the hole diameter, this makes a severe test in view of both the indexing and positioning of the work at four points.

Plungers were ground on a Landis machine, Fig. 5. The plungers are rough ground to 0.376 in. ±0.0005 in. Finish grinding to absolute interchangability is not attempted. The plungers are ground to a selective fit and are lapped in place during the final assembly. This is the same practice used in the automotive field for such parts as pistons and piston pins.

Another job on a Warner & Swasey is seen in Fig. 6. This is one of the two yokes, Fig. 7, that connect opposite plungers and form part of the ingenious mechanism that controls the flow of oil through this distributor. One of the yokes is shown in the box chuck and another on top of the turret.

This set-up is a striking proof of the rigidity of modern machine tools. It is unusual to see such a piece held by one crank cheek while the outer face of the other cheek is faced from the rough forging. After facing the end of the crank, it is centered with a combination center-drill and reamer, and a center run into position before the crankpin is turned.

With the tail center in place the inner crank cheeks are faced and the crank pin turned by the broad-faced tool at the rear.

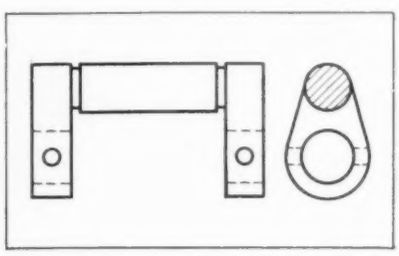


Fig. 7—The yoke pin is ground after hardening

DAD SAYS

What Our Plant Needs Is a Good M-e-n-t-a-l-lurgist

THE OTHER day the metallurgist was around checking up on some of the steel they were using and how they were using it. Well, at home that night, after I read the paper, I got to thinking.

Now these here metallurgists are sure to be around if anything goes wrong with the steel and they are pretty sure to get it fixed. Those birds certainly know all there is to know about steel, they'll tell you how fast you can machine it—how to heat treat it, and everything.

But here's what I was thinking about. If it's important to have experts like them just to take care of steel, why don't they have some experts like them to take care of us human beings?

Seems to me they could figure out just what kind of people will rub together the best, just like they know that steel and babbitt rub together better than rubbing steel on steel. They know that when two metals rub together with too much pressure on them they get hot unless you put in some sort of oil or grease.

Well, when a man and his boss rub together and get up a lot of heat, why don't they send an expert around to see if it's the wrong kind of men rubbing against each other or if they need a little grease or salve?

The next morning one of the "big shots" was checking up on some of our motors so I thought I would ask him why they didn't have human metallurgists. I started to tell him some of my thinking but he was 'way ahead of me.

First off, he said a good name for this human metallurgist might be a MENTALlurgist. Pretty clever I thought.

This big shot seemed a lot interested. He went on to say that a good employment man does a mentallurgist job all the time, for—just like the metallurgist specifies the kind of steel for every job—so does a good employment man know what kind of men should go on the various jobs.

He said he was going to see what he could do about getting the company to spend some money on a mentallurgical department. Well, we'll see what happens. Of course it's pretty hard to sell a new idea to all the "big shots."

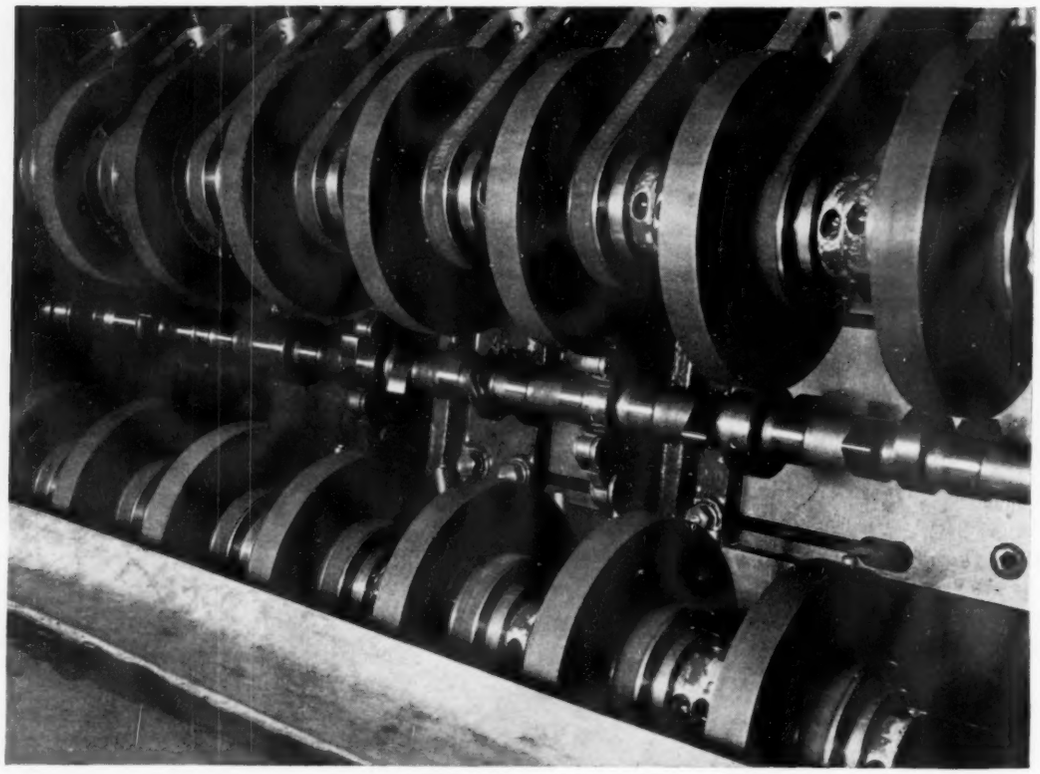


Fig. 8—A camshaft is Superfinished by being rotated slowly first in one direction, then in the other, while oscillating endwise

"Superfinished" Surfaces

II—Further examples of Chrysler's Superfinishing process that follow the general method of fine finishing described in a recent number

A. F. DENHAM

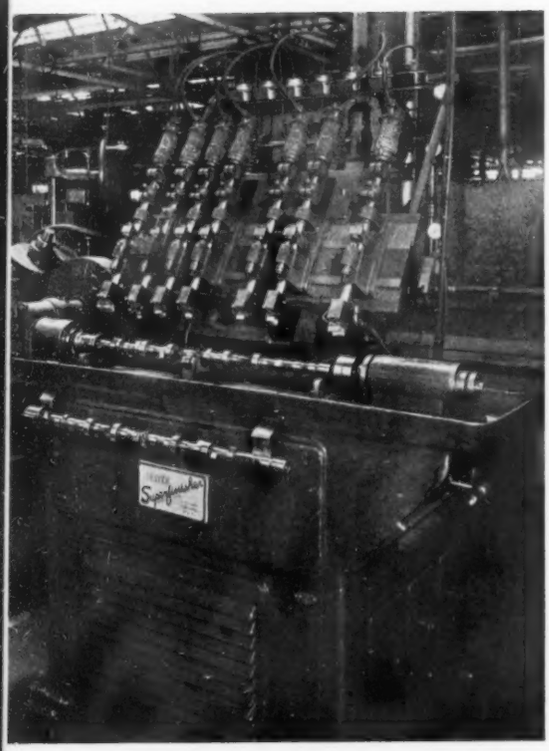


Fig. 9—Camshaft main bearings are finished by rotating them slowly while the stones are oscillated by means of individual motors

WHILE the stone and work movements in the operations previously described (*AM*—Vol. 82, page . . . .) are relatively simple, the operation illustrated in Fig. 8 represents a greater combination necessary to achieve the fine finish desired on the surface of the cams of the camshaft. Here individually V-belt driven wheels are used instead of stones. After loading the camshaft, the wheels are lowered against the shaft, pressure being controlled merely by the weight of the wheels themselves.

In operation, the camshaft rotates first in one direction at 22 r.p.m. while the wheels are driven in the opposite direction at 800 r.p.m. At the same time the shaft is oscillated $\frac{1}{8}$ in. endwise 230 times per min. At the end of ten seconds, the rotation of both camshaft and wheels reverse for another ten seconds.

Main bearings on the camshaft are Superfinished on the machine shown in Fig. 9. On this machine each stone is provided with an individual Hi-cycle motor which through an eccentric drive oscillates the stone lengthwise of the camshaft while the shaft is being revolved at low speed. Lubricant is fed onto the work surfaces through ducts behind each stone. Finishing time is eight seconds.

Particularly notable here is the flexibility designed into the machine, permitting rapid change from one type of camshaft to another. The second stone from the left, incidentally, finishes the fuel pump drive eccentric at the same time. The stones here are flexibly spring mounted so that they can change position to follow the contour of the eccentric cam.

One of the most interesting of the Superfinishing machines is shown in

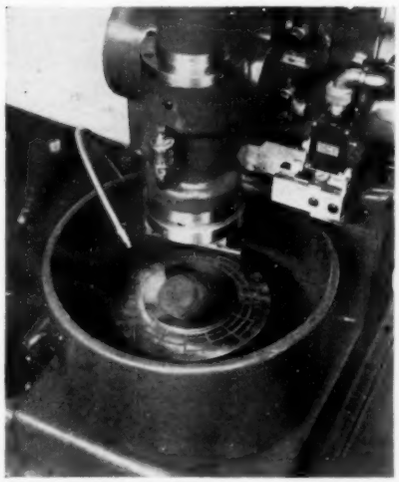


Fig. 10—In this machine for Superfinishing a variety of flat work, both work and wheel are rotated, both are oscillated and in addition the machine head slides backward and forward

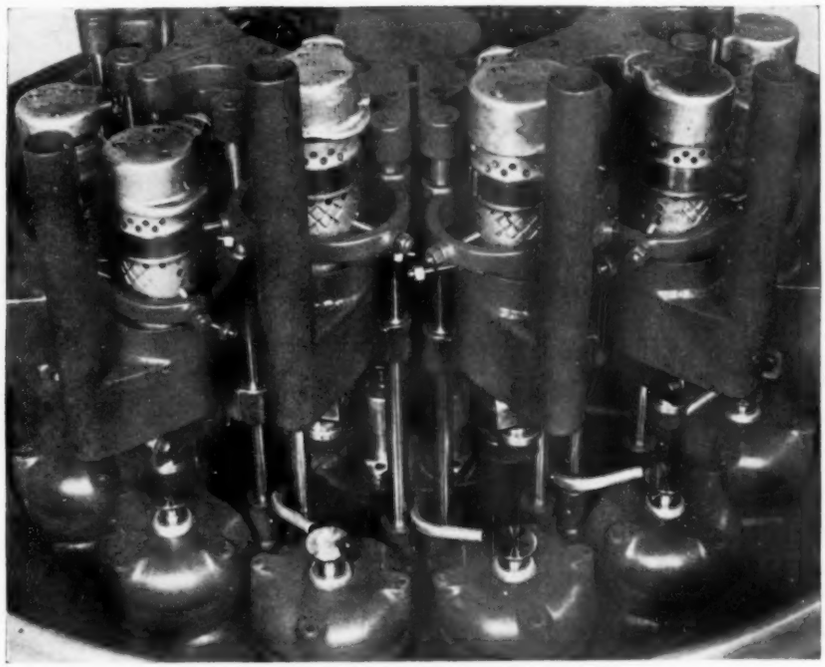


Fig. 11—Another surface finishing machine uses multiple, cup-shaped stones and continuous operation

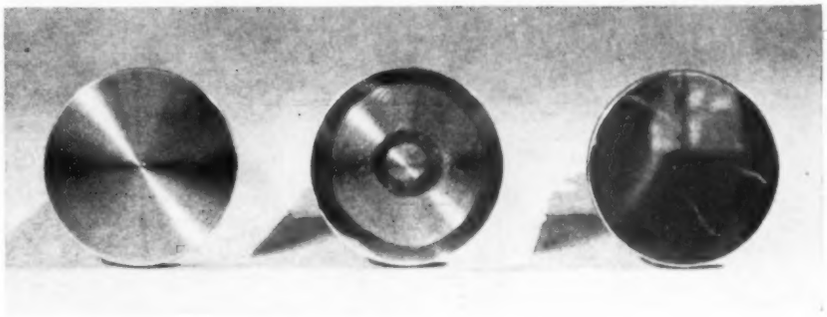


Fig. 12—*Left to right:* A tapped head is ground, apparently smooth; partial Superfinishing discloses dark highspots; completion of the finishing process removes the banded effect

Fig. 13—Shafts of parts having heads, such as valve stems, are held above the finishing stone until forced downward by a cork driving ring

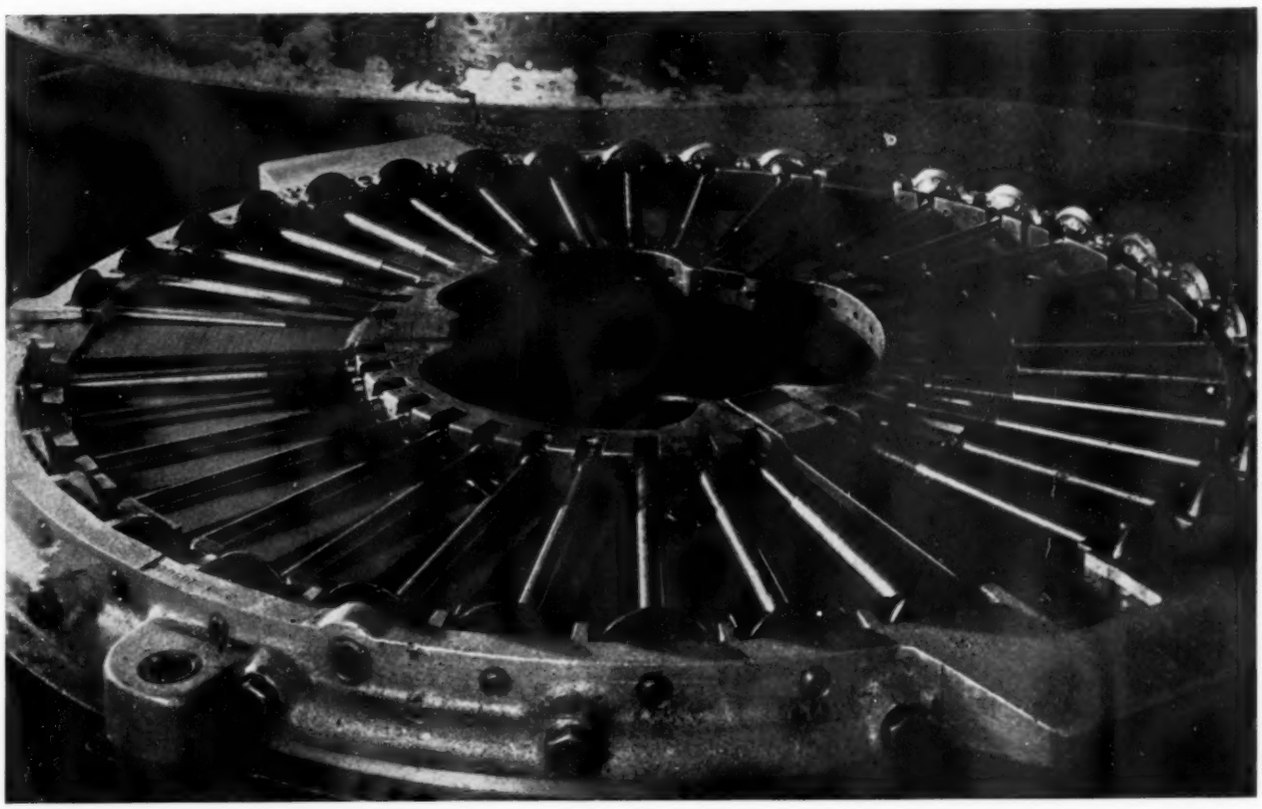


Fig. 14—The pattern of the partially completed finishing operation may be seen on the main shaft of an air-conditioning unit crank

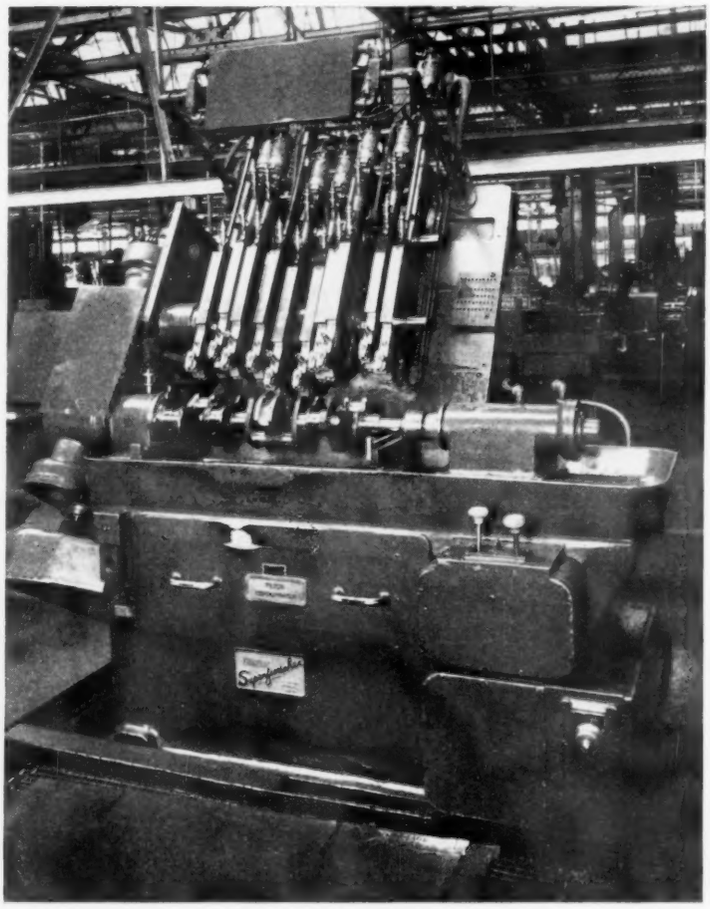


Fig. 15—Stone units are mounted on a master crankshaft which synchronizes them with the workpiece

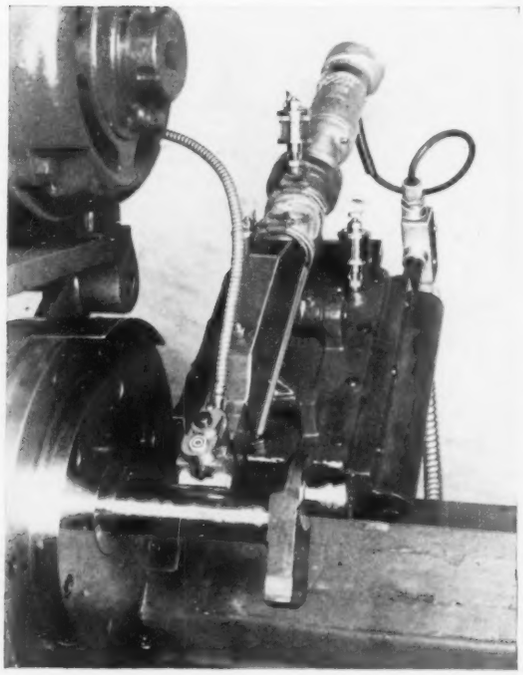


Fig. 10. It is designed for surface finishing of a variety of flat work. The table on which the work is placed consists of a round magnetic chuck, which is slowly rotated and also rapidly oscillated from right to left. The spindle on which the stone is mounted is rotated in the opposite direction and oscillates rapidly forwards and backwards. At the same time the entire head of the machine slides forward and backward slowly, giving a combination of five motions in different directions simultaneously. With this combination no one particle of grit in the stone ever retraces its path over the work. The machine is used for such parts as flat refrigerator valves.

Fig. 11 shows another machine used for surface finishing. Here as in the camshaft machine, individual Hi-cycle motors drive the cup shaped stones, rotating them eccentrically, while the tappets also slowly revolve. This machine is also continuous, the machine rotating continuously, stones being lifted out of and lowered into engagement before and after the loading station in the center of the illustration. Fig. 12 incidentally shows how the Superfinishing operation reveals waves in the apparently smooth ground tappet head.

Another rotary type of surface finisher is shown in Fig. 13, used for Superfinishing shafts of parts having heads, including tappet bodies and valve stems (illustrated). Parts are first assembled in the fixture which is then placed in the machine (a two- or three-station indexing machine could be used of course). The fixture is supported on springs which hold the work away from the ring-shaped lapping stone until the upper head is lowered. In the upper head is a cork ring-shaped driver which rotates in one direction, revolving the valve stems about their own axes, while the lapping stone is revolved in the opposite direction. In this operation the fixture itself is stationary and parts cannot be oscillated. Lubricant is copiously used, flowing out from the center aided by centrifugal action of the driver and rotating stone.

For Smaller Lots, Too

Application of the same principle to smaller production runs and simple parts is shown in Fig. 14 where the mainshaft of an air-conditioning unit crank shaft is being Superfinished. Here a single set of stones is oscillated lengthwise of the shaft rapidly, while being fed slowly from one end of the rotating shaft to the other. Here may also be noted the pattern produced by a combination of these three motions in the first stages of Superfinishing. For this machine, incidentally, there is an attachment which also permits finishing of the crankpin at the right hand end of the shaft.

The same principle illustrated in Fig. 14 is duplicated in multiple units in the finishing of an automobile crankshaft as shown in Fig. 15. A difference of course is that the Hi-cycle and stone units are supported on a master crankshaft which rotates in synchronism with the work. This machine is also designed for flexibility, permitting the finishing of a number of different types of crankshafts on the same machine, merely by changing the master crank.

While not a wear surface, seats for main bearing shells in Chrysler engines are now being Superfinished in order to obtain better contacts between shell and block for better heat conductivity. Fig. 16 shows the machine, with the stone-holder bar in place but without a block attached to the fixture at the right. The operation here is a rotation of the bar, a slow up-and-down feed of the bar over a considerable range and a simul-

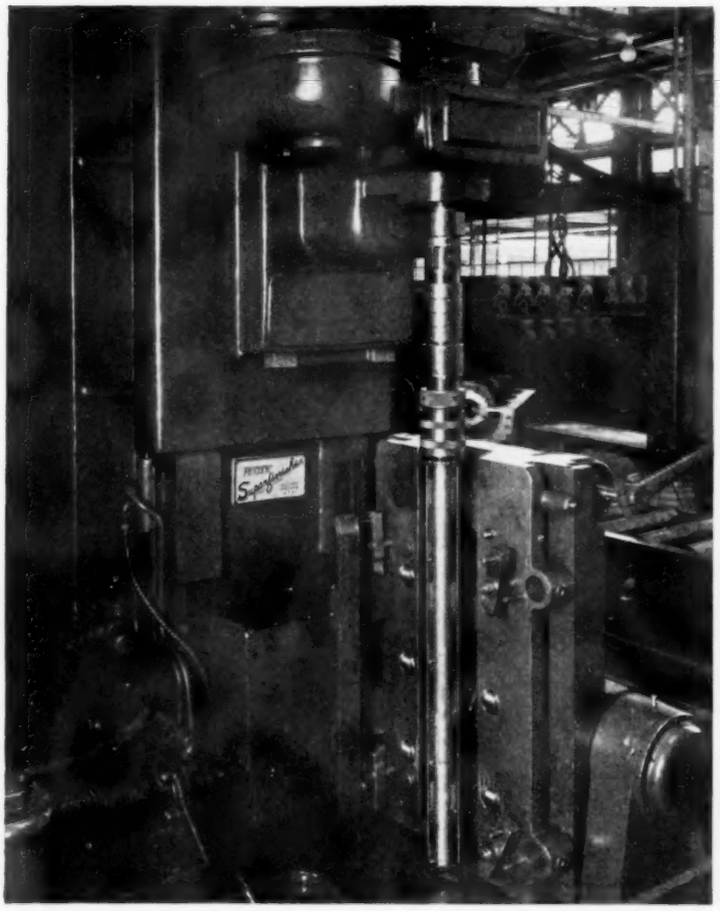


Fig. 16 — Bearing seats in cylinder blocks are superfinished in this fixture to give better heat conductivity to the bearing shells even though no motion between the surfaces is involved

Fig. 18—Surface scratches are measured in a Profilometer which splits millionths of an inch

taneous rapid up-and-down oscillation of the bar.

Fig. 17 shows another type of machine, used for finishing flywheel faces. On the machine the flywheel is rotated about its axis, while the stones oscillate in and out. Note the deep grooves in the stones to permit good distribution of the lubricant from the nozzles in line with the grooves.

Fig. 18 shows a typical selective inspection operation on Superfinished parts. Using a Profilometer, the magnified scale represents a total of 0.000001 in. on the upper scale between 10 and 20. According to Chrysler officials, some parts have been finished to a smoothness of 0.0000003 in., particularly for aircraft work, where the tiniest scratches may frequently start cracks in vital parts, resulting in fatigue failure of the part.

From the above it will be seen that the process has already reached fairly wide usage, in the Chrysler plant at least. Nevertheless improvements are still being incorporated in the process, the most important of which is the provision of hydraulic control mechanisms for the stone movements on the newer types of machines now being produced by Foster.

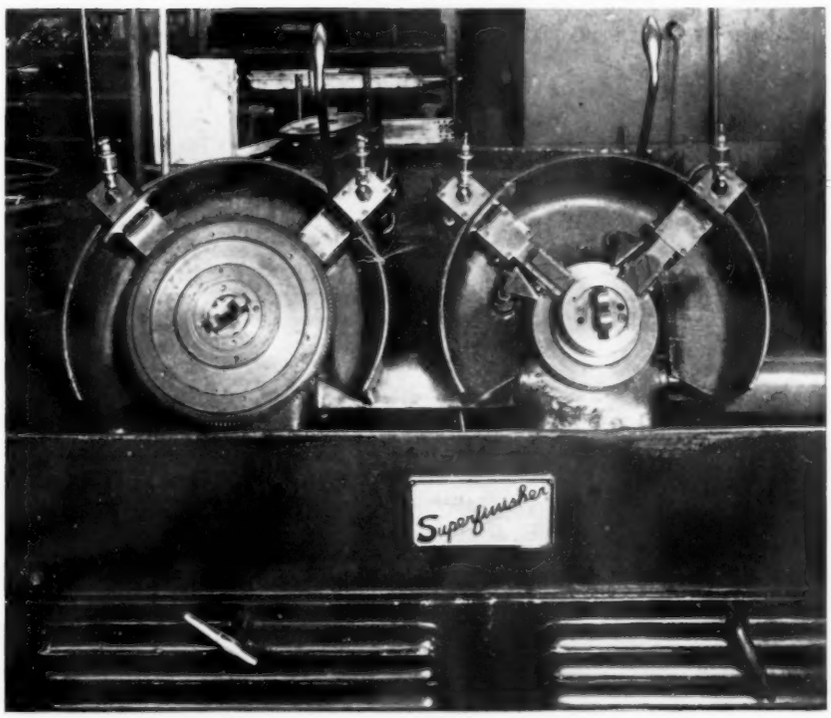


Fig. 17—Flywheels are rotated while stones oscillate inward and outward to finish the faces

PRESS WORKING OF METALS • NUMBER 2

Types of Presses and Their Selection

Gap-frame, straight-side and high-speed presses were described in a previous number, and this article continues with drawing presses and press selection

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Tool Engineer
Kobzy Tool & Electric Mfg. Company

LIKE high-speed presses described previously (AM—Vol. 82, page 684), drawing presses will be considered as a group without regard to frame construction.

The arch press, mentioned in the first installment, can be supplied with a long stroke, and is then used for redrawing deep shells. Strokes up to 20 in. can be had in this design.

Single-action straight-side presses can be had with a large hole in the bed to accommodate spring, rubber or hydraulic drawing attachments or cushions.

Toggle Presses

Double-action toggle presses are capable of drawing to greater depths than the single-action machines fitted as described. The outer slide, which is actuated by toggle links, descends and holds the blank to be drawn under the outside, or blank holder, slide. The punch, which is actuated by the main crank of the press, then descends. The punch ram operates through the outside slide and draws the shell to the proper depth. Toggle presses can be used for redrawing, in which case the slide centers the cup and the ram pushes the cup through the redrawing die. Perhaps the largest field for the toggle press is the manufacture of kitchen ware.

Hydraulic Presses

Hydraulic drawing presses involve a number of construction variations. Some have an external pumping unit connected to the press by suitable piping and valves, and operated at the press operator's direction. Other machines are self-contained in that they have an integral pumping unit mounted on top of the press. Ram pressures of 5,000 tons or more can be secured. High-speed pumps give hydraulic presses operating speeds that are comparable with those of the larger sizes of mechanical presses.

Horizontal Draw Presses

These machines are built in two types for redrawing cylindrical shells. The shell is either pushed through the die, or cam knockouts and strippers are provided if the shell is shouldered or requires bottom piercing. Presses driven like a shaper head are used for drawing pencil bodies. Crank-driven types redraw larger shells up to 3 in. in diameter by 8 in. deep. Shells are fed into a chute and a transfer slide transports them from the chute to the tools. Multiple-station presses will take a first-operation shell and reduce its diameter in as many as seven redrawing operations.

Multiple-Plunger Eyelet Machines

As many as eleven draws have been made by multiple-plunger eyelet machines. The lighter types are cam driven; the heavier models, crank driven. The plungers are vertical and in line, and extend the entire length of the press bed. Strip is fed to the first station where the blank is cut and shallow drawn. Work is transferred from station to station for redrawing operations by centralized gripping fingers at each station and attached within a reciprocating frame above the dies. The shells are knocked out of the dies, lifted into the transfer slide and engaged by the gripping fingers.

There are many other types of presses, but most of them are special and therefore of more limited use. Unusual problems involving nonstandard stroke, speed, pressure, or feeding arrangement are best determined by consultation with press builders.

Selecting the Proper Press

In the selection of the proper size and style of press for a given kind of work, E. W. Bliss Company gives the following data.

1. The size and type of die required.
2. The amount of stroke necessary.
3. The press pressure required for doing the work.
4. The distance above the bottom of the stroke where the pressure first occurs.
5. Any additional pressure required due to attachments, such as the blank holder, ironing wrinkles or stretching the material in drawn work.
6. The method of feeding, the direction of feed, and the size of the sheet, blank or work piece, may also determine the type of the press.

When the pressure occurs at or near the bottom of the stroke, with a comparatively short stroke, the tonnage given in the table is safe for a

given size of crankshaft. At this point the crankshaft is under a bending load similar to a beam supported at its ends with the load concentrated at the center.

When the pressure occurs at quite a distance *above* the bottom of the stroke, or when the length of stroke is comparatively long, as in toggle drawing presses, thereby increasing the effective crank-arm, the load on the crank-pin produces a torsional load on the crankshaft. This load on the crank bearing is limited by the gearing and the amount of torsion the crankshaft will safely take.

On some single-crank presses with a very long stroke, or on double-crank presses of great width or with a long stroke, and on all large single and double-crank presses, "twin gearing" or a gear on each end of the crankshaft is employed. This arrangement increases the gearing strength and torsional capacity of the crankshaft, and in the case of a wide double-crank press, reduces the torsional deflection of the crankshaft. However, under these conditions the load at the bottom of the stroke would still be governed by the figures given in the table. In all cases where twin gearing is used, the press would be operated by a friction clutch.

Capacities of Presses

The strength of a single-crank press is determined by squaring the diameter of the crankshaft in inches, taken at its main bearings, and multiplying the result by $3\frac{1}{2}$ tons. This formula gives the conservative strength of a single crank in tons, but only up to and including a 6-in. diameter shaft. It is advisable to select a press capacity in excess of the actual pressure required to do the work, at least 10 per cent higher. The formula given is for crankshafts having main bearings of equal diameters and which are located on each side of a single crank. The ultimate capacity is at the bottom of the crankstroke.

For double-crank presses the strengths are identical to those having a single crank up to 9 in. shaft diameters; above that diameter the double-crank presses exceed the strength of single-crank presses rapidly as the shaft diameters increase. This increase is shown in the following table.

Crankshaft Diam. Inches	*Tons Single-Crank Press*	*Tons Double-Crank Press*
$6\frac{1}{2}$	150	150
7	180	180
$7\frac{1}{2}$	215	215
8	255	255
9	345	345
10	440	450
11	545	650
12	665	900
13	790	1150
14	920	1400
15	1060	1700
16	——	2000
$16\frac{1}{2}$	1300	——
17	——	2300
18	1560	2700
20	1950	——
22	2380	——
24	2860	——

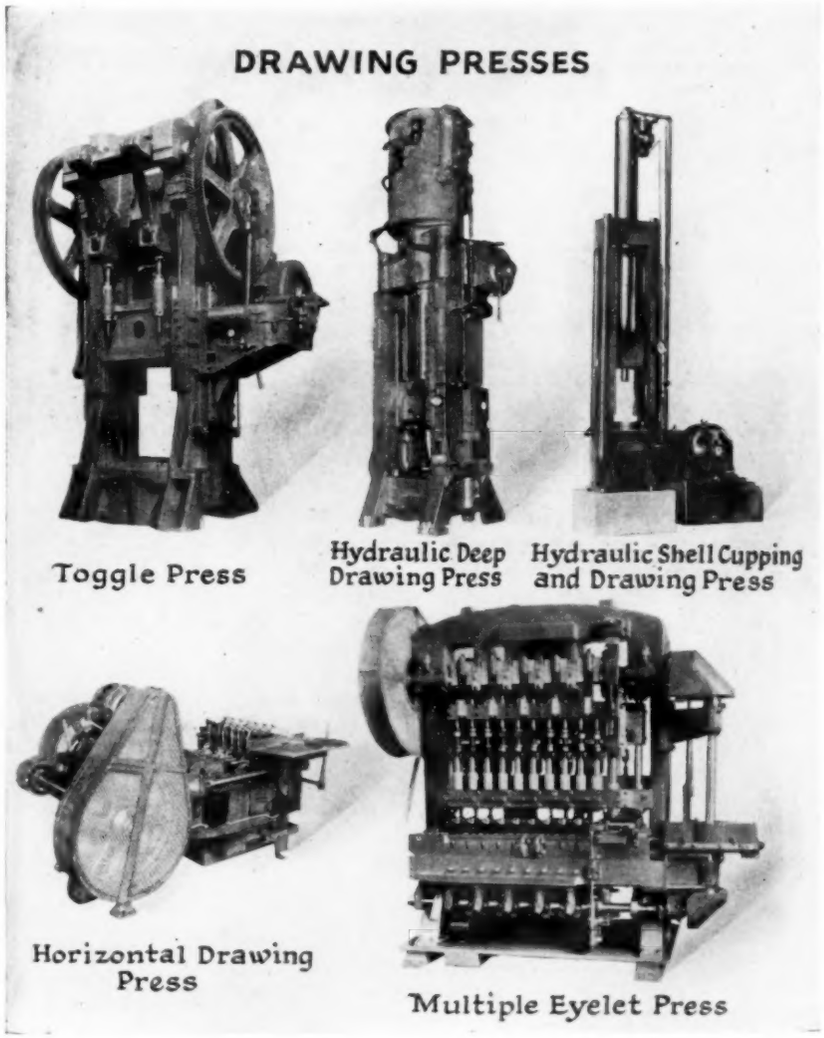
The tonnage figures do not apply to end-wheel type of presses which have an overhanging crankpin. Crankshafts are forged from commercial billets of about 0.45 carbon content steel. For extra strength and continuous high speeds, chrome-nickel-molybdenum steel forgings are used.

For capacities of presses operated by a crank-disk and overhanging crankpin, square the diameter of the crankpin and multiply the result by 3 tons.

By the following table of ultimate shearing strengths, it is possible to determine the pressure required for blanking a large variety of metals and other materials. The table is based on using flat-faced cutting members, but for a shearing cut, when the material does not exceed $\frac{1}{4}$ in. thick, use one-half the tonnage given, and for any thickness exceeding $\frac{1}{4}$ in., use two-thirds the table tonnage. Multiply the total cut length, or perimeter of the blank in inches, by the thickness of the material in inches, times the material tonnage given below. The result is the tons pressure required for shearing or blanking with a flat punch and die. If holes are pierced in the operation, their circumferences must also be added to the length of the blank outline.

Computing the Blanking Pressure

A blank with a total cut edge 12 in. long, is to be cut in a flat-faced punch and die. The material is 0.25 carbon steel, No. 24 U.S. Gage (0.025 in. thick). What blanking pressure is



required? Solution: 12 x 0.025 x 25 = 7½ tons.

Stripping Pressure

It is ofen necessary to know the stripping tension on cutting punches, especially in large dies; so that the stripper plate can be designed of adequate strength to avoid buckling. This is one of the most deceiving requirements in the design of large blanking dies. Unless it is actually computed and definitely known, serious mistakes in stripper designs sometimes occur. Stripping occurs at the critical moment when the blanked strip is carried up with the punches and suddenly hits underside the stripper plate.

Large automotive body shops have adopted the following formula, which is also of value for finding stripper pressures in small dies. It decides the size and number of screws necessary for holding the stripper plate.

P = Pressure required for stripping, in pounds

L = Length of the cut edge

T = Thickness of material strip

Then $P = 3500\ LT$

Drawing Pressure

The highest pressure that can occur in drawing is that which will rupture the shell. The formula for this condition is:

$$P = \pi\ dtS$$

Where:

P = the pressure

d = the mean diameter of the shell (outside diameter minus thickness)

t = the thickness of material

S = nominal ultimate tensile strength of the material.

Shells can not ordinarily be drawn to more than a 50 per cent reduction in material thickness in one operation without rupture. A discussion of this subject and a method of finding the actual drawing pressure and limits for reduction in thickness can be found in "Plastic Working of Metals" by E. V. Crane of the E. W. Bliss Company (published by John Wiley & Sons, Inc., New York).

Acknowledgments

Mr. Hinman and the editors of *American Machinist* are glad to acknowledge aid received from the following companies: E. W. Bliss Company; Chambersburg Engineering Company; Cleveland Punch & Shear Works Company; Consolidated Press Div., E. W. Bliss Company; General Machinery Co.; Greenerd Arbor Press Company; Henry & Wright Mfg. Company; Marquette Tool & Mfg. Company; Niagara Machine & Tool Works; Super Speed Press Corporation; Toledo Machine & Tool Company; U. S. Tool Corporation; V & O Press Company; and Waterbury-Farrel Foundry & Machine Company.

Mr. Hinman's series will be continued in an early number.

Ultimate Shearing Strength of Materials

	Tons per sq. in.
Aluminum, cast	6
" soft sheet	7½
" half-hard sheet	9½
" hard sheet	12½
Asbestos millboard	2
Brass, cast	18
" soft sheet	15
" half-hard sheet	17½
" hard sheet	20
Bronze, gun metal	16
" phosphor	20
Copper, cast	12½
" rolled	14
Cupronick 1	20
Duralumin, soft sheet	15
" treated	17½
" treated and cold rolled	20
Fiber, hard	12
Nickel silver, half-hard sheet	16
Iron, cast	12½
" 2 per cent nickel	25
" wrought	20
Lead	2
Leather, chrome	3½
" oak	3½
" rawhide	6½
Monel metal, cast	30
" " rolled sheet	32½
Paper, using hollow die	1½
" " flat punch	4¼
" bristol " "	2½
" strawboard flat punch	1¾
Silver	15
Steel casting	30
" boiler plate	30
" angle iron	30
" cold-drawn rod	29
" drill rod, not tempered	40
" nickel about 3¼ per cent	41
" " " 5 " "	42½
" silicon	32½
" stainless	35
" 0.10 carbon (soft)	22½
" 0.25 " (mild)	25
" 0.50 "	35
" 0.75 "	40
" 1.00 "	42½
" 1.20 " not tempered	47
" 1.20 " tempered	95
" hot—	⅙ to ¼ strength of cold
Tin, cast	3
" rolled sheet	2½
" sheet steel coated with tin	25
Zinc, sand cast	7
" die cast	8
" rolled sheet	9
" hard rolled	10

Cutting Oils Not to Blame

J. T. BEARD

Mechanical Engineer, Socony-Vacuum Oil Company

CUTTING and soluble oils, shipped from the various refiners, contain no harmful bacteria. The heat of the manufacturing and blending processes has killed all such organisms if they ever existed. Nevertheless, operators of machine tools are sometimes afflicted with pimples, boils or rashes from the use of these products. This is caused by the penetrating property that should be possessed by all good lubricants and coolants—a property which enables them to enter the pores of the skin.

This entrance of the cutting oil into the skin would be harmless, providing the oil carried no harmful material with it. The skin itself, however, is literally covered with harmful bacteria. Recently the Life Extension Institute has stated that 27 distinct diseases can be communicated by the bacteria on the skin of the average person.

Skin infections can be prevented by personal cleanliness and by strict plant hygiene. The following general rules are considered fundamental:

1. Keep drums and tanks covered, thus excluding dirt and germs.

2. Keep the skin of the body clean.

3. Protect the hands and arms from infection by rubbing vaseline, lanoline, or other ointment into the skin before starting work.

4. Change from street clothes to shop clothes before starting the shift.

5. Thoroughly wash hands and arms with soap and hot water after stopping work.

6. Use individual towels and brushes.

7. Avoid the use of waste or rags for cleansing the skin.

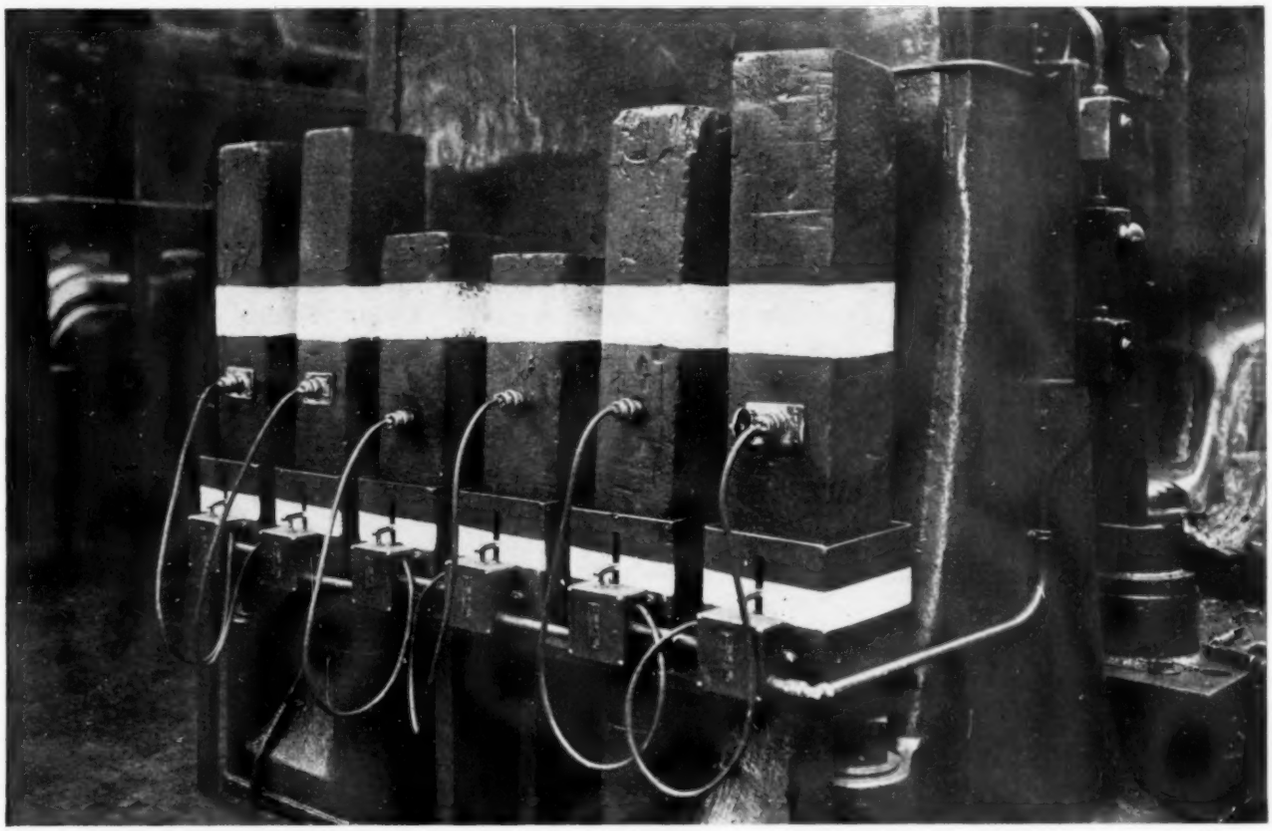
8. Change from work clothes to street clothes before going home.

9. Thoroughly wash or launder working clothes at least once a week.

10. Change underwear at least once a week.

11. Don't spit into drains and oil pans.

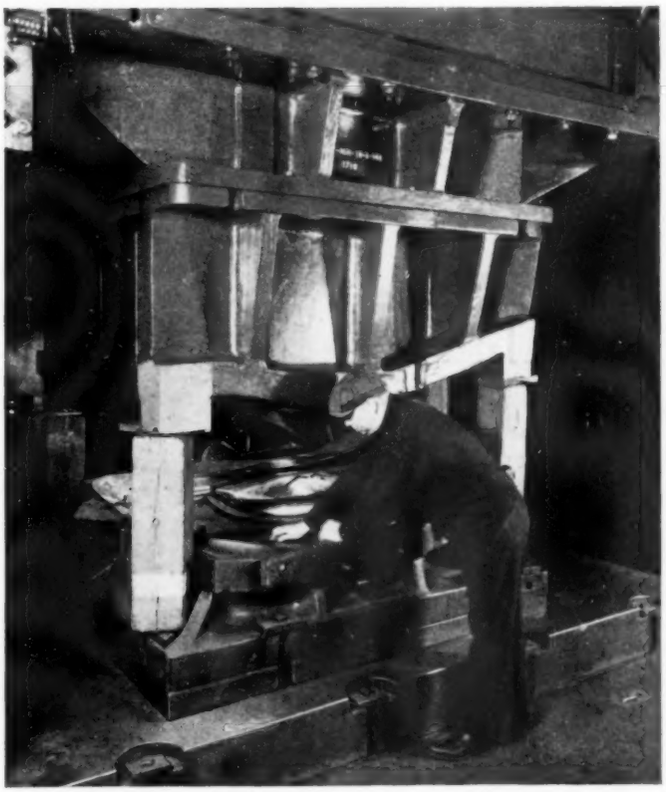
12. Attend promptly to cuts, abrasions and to skin rashes.



Blocks carry electric plugs and must be removed from the press platen before the machine can be started

RAM BLOCKS THAT BLOCK ACCIDENTS

TYPICAL of the precautions taken to prevent accidents in the Ford press shop is the method employed for blocking up a die while it is being set up and checked. The use of blocks for this purpose is common in press shops, but two things are important. First, the blocks must be handy at all times if they are to be used on every set-up and second, they must be removed before the press is operated. Both these ends are achieved by providing a series of brackets for the blocks behind the press and equipping the blocks themselves with electric sockets. Electrical leads from switch-controlled relays must be plugged into the socket before the electrical circuit can be completed and the press put into operation. This insures that every block must be in place behind the press before the ram can be moved.



Wedge blocks are placed between the upper and lower sections of the die while the operator checks the set-up

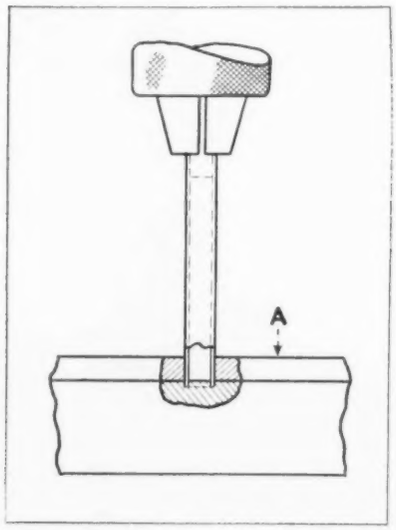
IDEAS FROM PRACTICAL MEN

Holes in Hardened Tool Steel

A. SCHUNEMAN
Assistant General Foreman, Tool & Die Department, General Electric Company

Reading the article under the above title by Walter Kassebohm (*AM*—Vol. 82, page 371) recalls to mind the method used by us for drilling unanticipated holes in hardened die sections, either for screws, pilots, dowels, or for piercing. In doing this class of work we employ the same method as is used in drilling glass.

A guide plate *A* of ordinary steel about $\frac{1}{4}$ in. thick and having a hole of the same diameter as that to be drilled is clamped on the die-block with its hole centered over the location of the hole to be drilled. A piece of copper tubing of the same outer diameter as that of the hole to be drilled and having a wall thickness of about $\frac{1}{32}$ in. is held in the chuck of the drill press, the upper end being plugged to prevent it from collapsing when the chuck is tightened.



Thin-walled copper tubing revolving at high speed and fed with a mixture of abrasive and oil will cut through hardened steel quite rapidly

By revolving the tube in the hole in the guide plate and feeding a good grade of grinding compound to its lower end and using intermittent pressure, the tube will cut into the hardened steel and will eventually remove a core of approximately the same diameter as that of its hole. The guide plate should be removed after the work has been drilled to about $\frac{1}{4}$ in. in depth.

We recently drilled a $\frac{1}{2}$-in. hole through $1\frac{5}{8}$-in. hardened tool steel in approximately 3 hr., using No. 80 Aloxite mixed with lard oil, running the tubing at about 600 r.p.m. We have also drilled hardened high-carbon and high-chrome alloy steels, but the time required was about 60 per cent longer than for carbon tool steel.

This method is being used throughout the several toolrooms in our plant and has saved much time and expense.

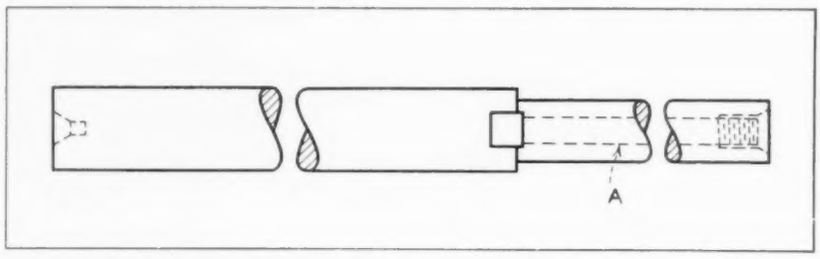
Boring Bar for Long, Small Holes

MERRILL E. BROWN
Brown Machine Works

In a production job we had to bore some long holes of comparatively small diameter. Naturally we wanted a boring bar that was as stiff as possible to stand the maximum cut and give the best finish with the least vibration and chatter, so we made the bar illustrated.

The bar has two diameters, the smaller one entering the hole already in the work and the larger one just enough smaller than the finished hole to allow clearance for the chips. The square hole for the cutter is in the larger diameter except for about $\frac{1}{16}$ in. which is for the cutting edge and for chip clearance. An axial hole is drilled in the small end of the bar, extending to the cutter slot, and is tapped at the outer end for a setscrew. The rod *A* is inserted in the hole and holds the cutter when the set-screw is tightened. Thus the usual crosswise hole for the setscrew with its consequent weakening of the bar is avoided.

If the small end of the bar is to be supported in a bushing, as in the overarm of a milling machine, the setscrew in the end can be of the hollow or safety type. If it is to be supported by a center, a regular setscrew having a countersunk center hole in the head can be used.



Instead of a crosswise setscrew, the cutter is held in the bar by a rod in an axial hole in the small end and backed by a setscrew

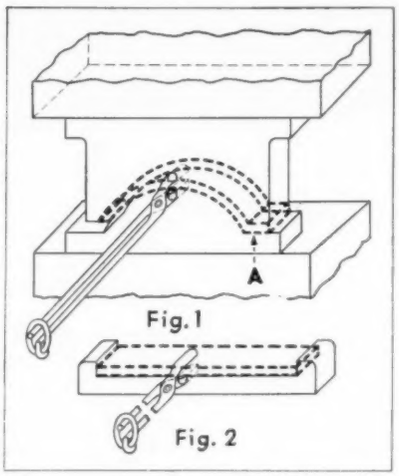
Press Tools for a Bracket

PAUL C. BRUHL

The press tools shown in closed position in Fig. 1 are for forming a foot on the bracket indicated by heavy dotted lines.

To locate the stock off center in the tools as required, it was first placed in the loading block illustrated in Fig. 2, in which it was confined endwise by ledges, and in which a clearance groove had been cut off center for the lower jaw of a pair of strong tongs. The lower jaw of the tongs was inserted in the groove below the stock and the tongs were tightened on the stock by a locking link placed over the ends of the handles.

Tightly held by the tongs to prevent it from creeping until the bend had been started, the stock was then transferred to the forming tools. Each member had a clearance groove for one jaw of the tongs. So long as the lower jaw of the tongs rested properly in the groove in the lower member of the tools, the stock could not creep as the foot *A* was being



Tongs positioned on the stock by a groove in a loading block locate the piece on the lower member of the forming tools by fitting in another groove

bent, or could the descending upper member of the tools strike the upper jaw of the tongs and cause them to jump and injure the operator.

Ingenious Replaning of Shaper Ways

J. E. STANLEY
Superintendent,
West Point Foundry & Machine Company

Our 24-in. shaper has been in constant use since 1911 and both the ram and the ways needed to be replaned. While the ram was easily replaned, we had no planer large enough to take in the column for replaning the ways.

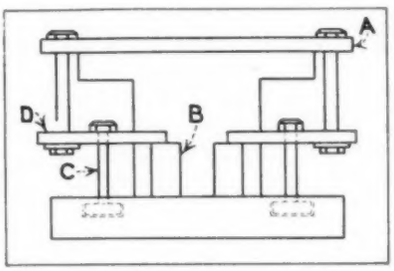
To overcome the difficulty, the crossrail *A* from a 30-in planer was clamped face down on supports attached to the shaper column, as shown in Fig. 1. The clapper box was removed and in its place was attached a flange, the hub of which carried a bar having a toolbit in an axial hole in its end, as at *C*, Fig. 2.

Planing was done by traversing the head along the crossrail by turning the screw by hand with a crank *B*. The cross-feed was accomplished by turning the down feed screw, and the depth of cut was regulated by adjusting the toolbit in the bar. The job required about seven hours and the planing was so smooth that very little scraping was necessary.

Offset Hold-Down Bolts

F. J. WILHELM

Referring to the article by J. E. Moore under the above title (*AM*—Vol. 82, page 126) the arrangement illustrated has been used by the writer with good results where the hold-down bolts had to be farther apart than were the T-slots in the machine table.



With this arrangement there is no need for welding together the heads of any of the bolts as described in the article

The strap clamp *A* will, of course, vary in length with the size of the work to be held. Likewise, the height of block *B* will vary with the height of the work and the length of bolt *C*. The pull on the clamp is direct, while that in Mr. Moore's arrangement is not and welding of bolt heads is eliminated. The clamp *D* and the block *B* can be placed at any angle required in the horizontal plane and standard bolts can be used.

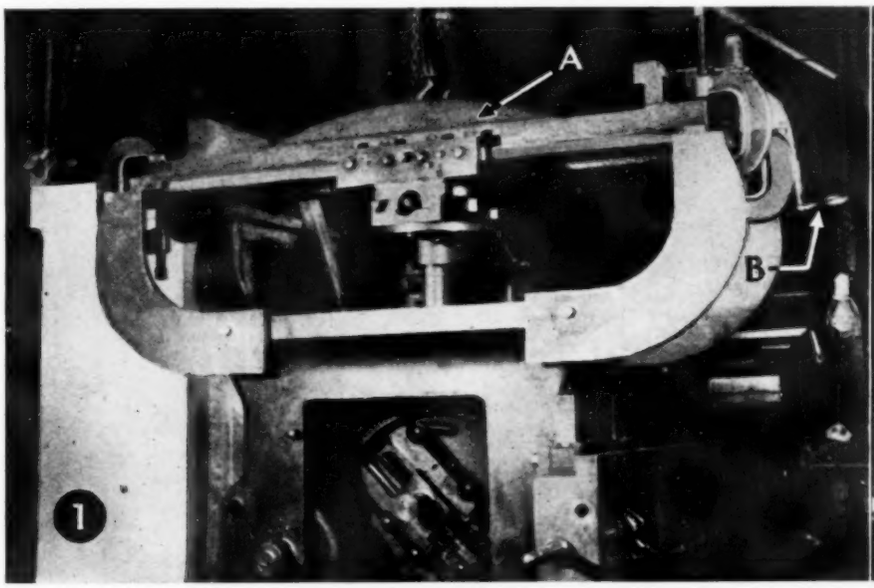
Circular Form Tool for Internal Threading

LEONARD A. KROLL

Many machinists find it difficult to cut internal threads accurately in fairly small bores with the lathe running at high speed and still have the edge and especially the point of the tool stand up.

With a tool of the type illustrated, made of high-speed steel, I have cut internal threads in bores from $\frac{1}{2}$ in. in diameter upward and the tool has proved to be very durable. The dimensions in the illustration give some idea of the proportions of the tool. For small work, the size of the tool is decreased proportionally and vice versa. In use, the tool is held in the ordinary toolpost in a V-block of the kind used for round-shank boring tools.

In making tools of this type I have often annealed discarded high-speed steel reamers and long taps to obtain the material. Due to lack of equipment I have omitted grinding the flanks of my tools of this type, but in that case it is necessary to be sure that no scales or blisters are formed



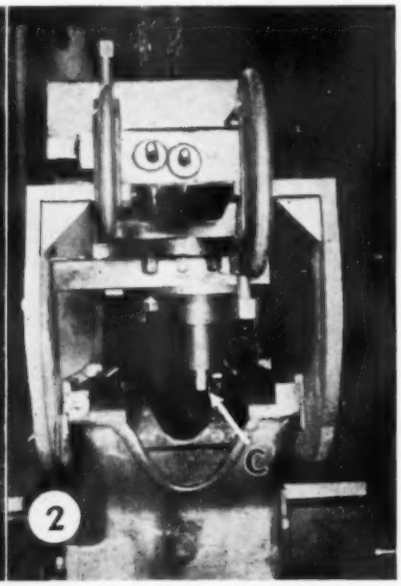
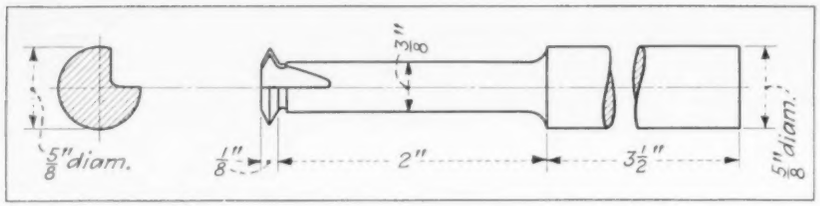


Fig. 1—A planer crossrail was clamped on supports affixed to the shaper column. Fig. 2—A bar with toolbit replaced the crossrail clapper box and was used to replane the shaper ways in 7 hr.



Circular threading tools have many advantages, chief of which is long life due to the many grinds possible before scrapping

on the tool in heating for hardening.

Tools of this type have a long life due to the large number of grinds possible before scrapping. Cutting may be done at the back of the hole by rotating the tool 180 deg. axially and running the lathe backward, giving better visibility of the work and the tool and permitting much better lubrication.

Embossing and Bending

CHARLES H. WILLEY
Superintendent of Manufacturing, Hoyt Electrical Instrument Works

The simple press tools illustrated were designed for embossing a rib and bending a tab at a right angle on a small part of thin aluminum, embossing being required to stiffen it.

Previous to the operation the blank appeared as at *A*, and after the operation as at *B*. The blank is nested in the recess *C* in the bending die, being located by the pin *D* engaging a hole pierced in the tab in the blanking operation. The embossing die *F* is supported from below by the concealed springs *H*, as shown in the sectional view at the top. The punch *I* is recessed at *K* for the thickness of the tab to be bent and its face is ribbed at *L* for forming the rib in the part in the groove *M* in the embossing die.

In operation, as the ram descends and the punch contacts the work, the rib is embossed. As the ram continues its descent, the embossing die and the long tongue on the part are carried down against pressure of the springs, bending the tab over the bending die.

Depth Gage Used as Inside Micrometer

ARTHUR SILVESTER

Referring to the article under the above title by H. Moore (*AM*—Vol. 82, page 382), I can see where the device would be very useful on one type of lathe work. I allude to such work as half bearings or segments that are clamped on the faceplate to be bored, and which cannot be measured for diameter in the usual way, due to the fact that they are parts of circles only. But to use the device correctly, the spindle in the depth gage would have to be practically a point instead of being flat at the end. Not only that, but the lathe centers must be true and in accurate alignment.

If an error is made by using the device advocated by Mr. Moore, seeing that one-half of the diameter only is measured, the error is doubled.

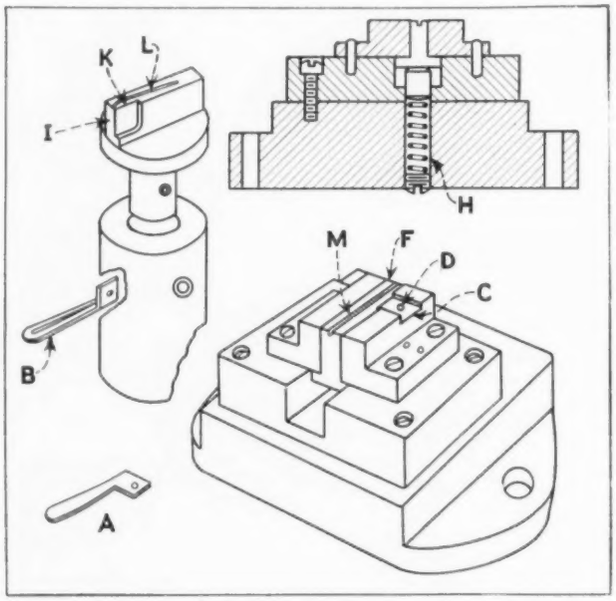
Single-Cutter Cutting Tool

E. C. JONES
Shop Practice Department, Kansas State College

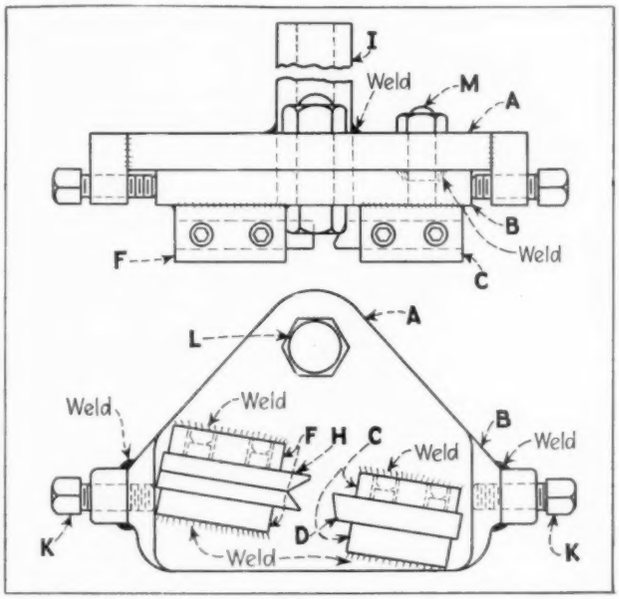
The single-cutter turning tool illustrated is for use in a small hand-operated turret lathe and was built up by arc welding.

The triangular plates *A* and *B* were cut from ½-in. stock. The blocks *C* for holding the toolbit *D* and the blocks *F* for holding the backrest *H* are welded to plate *B*, while the shank *I* for holding the tool in the turret and the lugs for the adjusting screws *K* are welded to plate *A*. Plate *B* is attached to plate *A* by the capscrew *L*, about which it swivels as a center. It is locked by a nut on stud *M* which is screwed into plate *B* and is further secured by welding.

Both the toolbit and the backrest are secured in their holding blocks by headless setscrews of the safety type. The backrest consists of two tool bits, the inner ends of which are ground at an angle to support the work. The shank *I* has a ½-in axial hole for the passage of long work when necessary. A suitably curved slot in plate *A* (not shown) permits stud *M* to slide as plate *B* is swiveled.



A stiffening rib is embossed on a thin, light aluminum part and at the same time a tab on the part is bent at a right angle

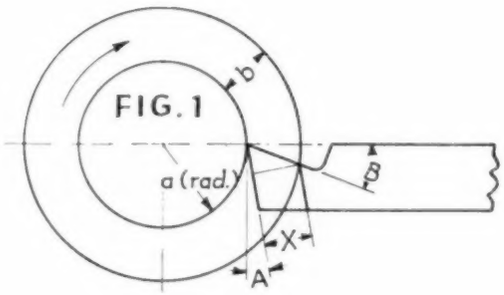


This single-cutter turning tool for a hand-operated turret lathe was built up by arc welding the members to the triangular plates

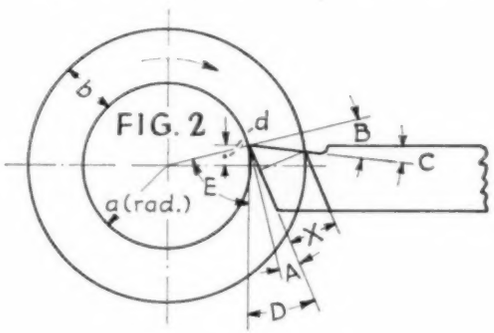
AMERICAN MACHINIST *Reference Book Sheet*

Corrections for Flat External Form Tools

BERTIL FALCK
Tool Engineer, Eclipse Aviation Corporation



$$X = \left[\sqrt{a^2 \cos^2 B + (b+2a)b} - a\cos B\right] \times \sin\left[90° - (A+B)\right] \text{ . . Equation 1}$$



$$X = \left[\sqrt{a^2 \cos^2 B + (b+2a)b} - a\cos B\right] \times \sin\left[90° - (A+B)\right] \text{ . . Equation 1}$$

$$\cos E = \frac{d}{a} \text{ . . . Equation 2} \qquad D = 90° + A - E \text{ . . . Equation 3}$$

$$C = B + E - 90° \text{ . . . Equation 4}$$

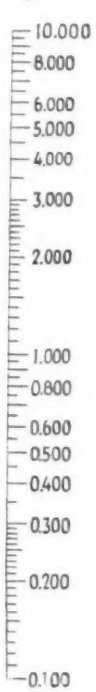
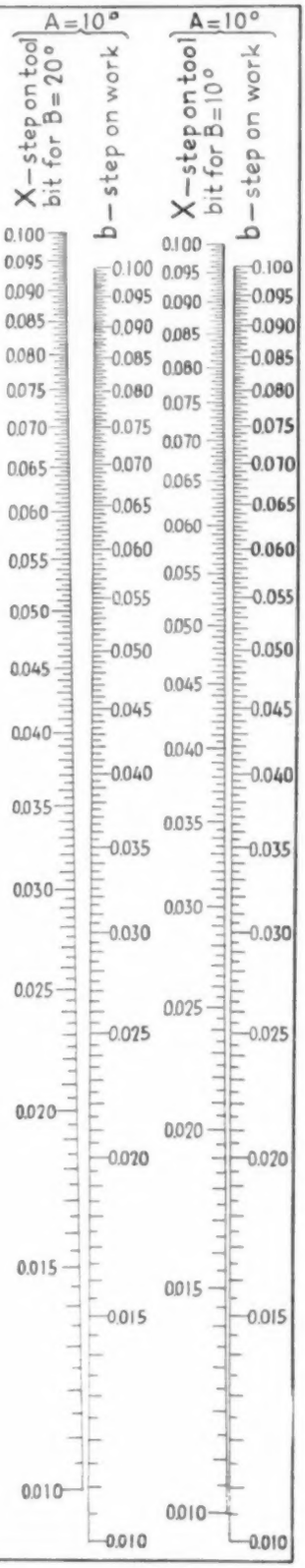


Table A — Front Rake and Clearance Angles for Various Materials

High-Speed or Cemented-Carbide External Form Tools

Material	Front Rake *B*	Front Clearance *A*
Steels	10 deg.	10 deg.
Aluminum Magnesium Zinc alloys Bakelite Fiber	20 deg.	10 deg.

Continued on the next page



AMERICAN MACHINIST *Reference Book Sheet*

Corrections for Flat External Form Tools

Use of Charts for External Form Tools

Cutting on the Centerline of the Work — Fig. 1.

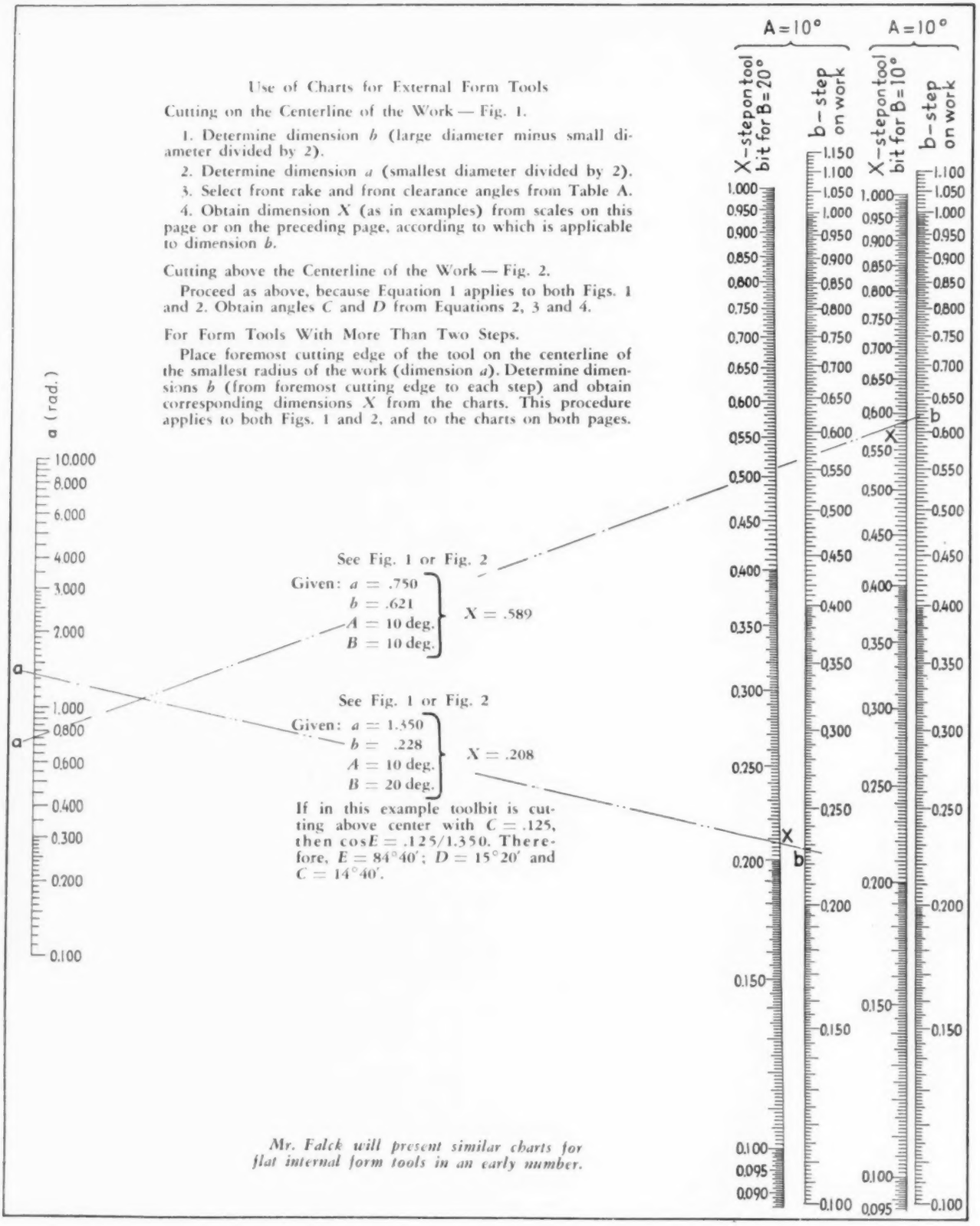
1. Determine dimension *b* (large diameter minus small diameter divided by 2).
2. Determine dimension *a* (smallest diameter divided by 2).
3. Select front rake and front clearance angles from Table A.
4. Obtain dimension *X* (as in examples) from scales on this page or on the preceding page, according to which is applicable to dimension *b*.

Cutting above the Centerline of the Work — Fig. 2.

Proceed as above, because Equation 1 applies to both Figs. 1 and 2. Obtain angles *C* and *D* from Equations 2, 3 and 4.

For Form Tools With More Than Two Steps.

Place foremost cutting edge of the tool on the centerline of the smallest radius of the work (dimension *a*). Determine dimensions *b* (from foremost cutting edge to each step) and obtain corresponding dimensions *X* from the charts. This procedure applies to both Figs. 1 and 2, and to the charts on both pages.



See Fig. 1 or Fig. 2
Given: $a = .750$, $b = .621$, $A = 10$ deg., $B = 10$ deg. → $X = .589$

See Fig. 1 or Fig. 2
Given: $a = 1.350$, $b = .228$, $A = 10$ deg., $B = 20$ deg. → $X = .208$

If in this example toolbit is cutting above center with $C = .125$, then $\cos E = .125/1.350$. Therefore, $E = 84°40'$; $D = 15°20'$ and $C = 14°40'$.

Mr. Falck will present similar charts for flat internal form tools in an early number.

NEWS OF THE INDUSTRY

New Union Drives Are Likely As Business Improves

"Little Steel," southern and mid-western shops seen as first targets in organization plans

FRANK RISING
Labor Editor, American Machinist

NEW YORK—Much as a long-expected barrage may begin in one sector and sweep along the battle line preceding a general advance, the first guns have spoken in the next big drive for labor union members. As has been forecast in *American Machinist*, two big C.I.O. unions are moving first to open new organization drives: Phil Murray's steel workers are preparing to campaign in the field after the Walsh-Healey wage standards are set; Sidney Hillman has opened the new textile unionization drive with personal conferences in Charlotte, N.C., and Worcester, Mass.

Other unions in both A.F.L. and C.I.O., in all sections of the country, are watching business reports to see when the boss begins to make enough money to make demands for union contracts worth while. Latest advices about continued upward trends in metal-working and machine tool industries, particularly, are being devoured at union headquarters.

However, it should be noted that the union campaigns are tuned to a much slower tempo this time than they were during 1936 and 1937. Roughly, the union strategists figure that the next eighteen months will be a good period for organizing, that requests for simple recognition should be the main goal, and that any substantial increases in wages are out of the picture at least for a year. This does not mean that, here and there, an employer with exceptionally good business, and wage rates below the community or industrial average, won't face demands for increases—but the general campaign is going to be more of a long-haul, slow-developing thing. Outward evidences of the union drives will not be apparent, in any quantity, for some time yet—but the boys are getting their orders.

Meanwhile, politics, NLRB attacks and defense, and clashes of personalities such as those which are pulling David Dubinsky and Homer Martin away from the C.I.O., are keeping the union policy-makers busy. As was expected by close observers (*AM*—Vol. 82, page 696b), a lot of the heat and excitement has gone out of the steel-wage situation, but the United Automobile Workers' internal quarrel and the C.I.O.-A.F.L. war have got worse. Increasing the tension between the two big labor groups are the various state primaries and the renewed squabble over NLRB powers.

As to the first point of argument—politics—no cessation of the battle need be expected prior to November elections. In many places the rank and file of the opposed labor federations are working hand-in-hand behind liberal candidates, but President William Green and Chairman John Lewis are getting no closer together. Anti-C.I.O. sentiment among the A.F.L. executive ranks, as a matter of fact, is more intense and bitter now than ever before.

That the rivalry will bring the older federation out against the Wagner Act, however, is not to be expected. Firing all of its guns against the labor board, and getting more furious with each decision which favors the indus-

LATE *NEWS* WIRES

WASHINGTON—Latest guess on completion of U. S.-United Kingdom trade agreement is early September, but State Department has some hope of getting it signed so Roosevelt can talk about it when he goes to Canada probably late this month.

WASHINGTON—"Cracker-Jack committee" and "some of the best brains in the army" are among the comments of munitions authorities here on the appointment of Brigadier-General Henry H. Arnold and aides to handle the educational orders authorization.

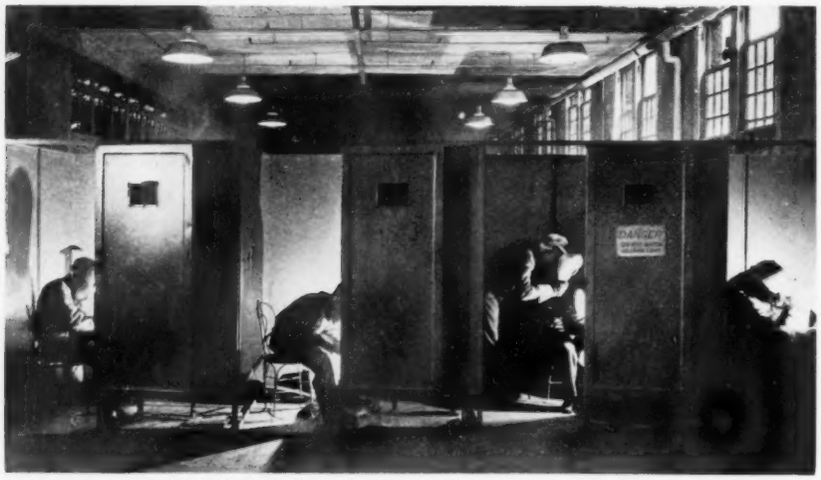
NEW YORK—The Soviet Russian government has announced that it will buy a minimum of forty million dollars worth of American goods during the calendar year 1939. A considerable portion of the purchases will be machine tools.

NEW YORK—Germany is understood to have placed orders in the United States for machine tools costing $170,000 to be used in production of the new low-priced, government-sponsored automobile.

DETROIT—Buick and Studebaker, always among the first to announce new models, are reported to have bought initial steel tonnages for 1939 production. Automobile executives still look for next year's sales to be 20% better than sales this year.

DETROIT—Chevrolet sold more cars in July than in June and had the biggest used car sales in July in its history.

CHICAGO—International Harvester has opened tractor works and shops at McCormick and its West Pullman works after a two-weeks' shutdown. The tractor works, however, will close again shortly. Rock Island tractor plant will stay idle indefinitely. Milwaukee plant will shut down August 15 for an indeterminate time. Farm implement plants around the country have been reopened and will continue work in proportion to incoming business.



***Welding at Westinghouse*—Each student in the Westinghouse welding school has a booth and a machine for his individual use throughout the entire course, which lasts five weeks. Training is given with both bare and coated rods, and additional equipment is available for instruction in automatic welding**

trial unions, the A.F.L. still must stand behind the act under which the board operates. The act was pushed through by the federation—a fact which many persons forget but which the rank and file of the craft unions remember. And the executive council would have a fair-sized revolt on its hands if it joined any of the employer-sponsored drives to amend the act. It can only center its attack on the personnel of the board, and hope to get more consideration for the craft unions into the *interpretation* of the labor act.

The C.I.O., meanwhile, figures that the Wagner Act is in no real danger, and isn't worrying much about the anticipated moves to amend it, in the next Congress. Most of the heavy work in the industrial unions' headquarters these days is being done research-wise to bolster appeals which will flood the offices of Administrator Andrews of the new wage-hour law, after it goes into effect next Oct. 24. Inasmuch as the law attempts mainly to oversee the payment of a 25-cent hourly minimum, the A.F.L. is not concerned deeply—its members are mostly better paid than that. But there are thousands of union prospects for C.I.O. among the lower-paid workers, if the C.I.O. can convince them that it got the law passed and got the wages boosted.

In the metal-working trades, meanwhile, the question which springs to the fore is: "Will 1937 be duplicated?" The answer is easy: it will not. Two kinds of organization campaigns are in the cards; (1) a slow penetration of southern and middle-western shops hitherto more or less untouched; (2) another attempt to unionize and get contracts with "Little Steel." The latter campaign will be slow and careful, with the unions taking as much advantage as possible of thes NLRB hearings against some of the steel companies, the La Follette investigations and similar public sensations to build pro-union sentiment in the steel communities. Organizers are already at work, but the union feeling is that much too much haste was shown last time, and that this move won't be rushed.

Metal Working Firms Get R.F.C. Funds

Industrial loans made by the Reconstruction Finance Corporation during June, as shown by a report submitted to Congress August 4, totalled $17,656,760. This shows a marked increase over May, when such loans totalled $13,091,802. In addition, the RFC joined with banks in loaning $1,150,610 to 67 different industrial borrowers. This was an increase of nearly $400,000 over participations purchased in May.

During Jun ethe RFC agreed with banks to join in 64 other loans aggregating $4,621,590.21.

Loans made during June for public bodies totalled $11,893,500.

A number of loans were authorized for metal-working industries as follows: Metropolis Bending Company, Metropolis, Ill., $60,000; Moline Foundry and Machine Company, of Moline, Ill., $18,000; Thompson Foundry and Machine Company, Thomasville, Ga., $24,600; Acorn Iron Works, Detroit, $12,000; Independent Tool and Gear Company, of Dexter, Mich., $10,000; Friedland Iron and Metal Company, Lansing, $15,000; Metal-Clad Doors, Inc., Cambridge, Mass., $7,500; Muskegon Machine Company, Newburgh, N. Y., $25,000; Andrews Machine Company, New York, $1,600.

In addition, the RFC joined with the Mechanics State Bank of St. Joseph, in a loan of $7,500 for the Motor Parts and Bearings Company, of St. Joseph, Mo. The RFC joined with the Second National Bank of Bucyrus in a loan of $6,500 to the Crawford Steel Foundry Company Bucyrus, Ohio, and with the American Savings Bank of Cleveland, in a loan of $32,000 to the Glauber Brass Manufacturing Company.

The RFC agreed to join with the Anniston National Bank in a loan of $100,000 for the Kilby Car and Foundry Company of Anniston, Ala., and with the Manufacturers National Bank of Detroit in a loan of $6,750 for the Machined Parts Corporation of Detroit. The RFC agreed to join with the Irvington National Bank in a loan of $30,000 to the American Abrasive Metals Company, of Irvington, N. Y. and with the National Exchange Bank and Trust Company in a loan of $62,500 for the Ohio Foundry and Manufacturing Company of Steuvenville.

School for Finishers

The DeVilbiss Co. announces the schedule of their training school for the last half of 1938. This school is open to painters, master painters, automobile refinishers, and all others interested in learning the technique of spray painting. Complete information may be obtained by writing the DeVilbiss Co., Toledo, Ohio.

Metal Organizations to Hold Joint Meeting

At the invitation of American Iron and Steel Institute and American Institute of Mining and Metallurgical Engineers, a joint autumn meeting will be held in the United States by the two British Institutes, The Iron and Steel Institute and The Institute of Metals.

The opening session of the joint meeting will be held in the auditorium of the Engineering Societies Building on the afternoon of Monday, October 3, and a banquet in honor of the visiting members of the British Institutes will be held at the Waldorf-Astoria, New York City, on the evening of October 3.

WATCHING WASHINGTON

Majority pleased with appointment of Andrews . . . Committees swamped with reams of figures . . . Possibility of two six-hour shifts to avoid overtime . . . Few employers expected to risk prosecution . . . Eventual ownership of foreign shipping service expected

McGRAW-HILL WASHINGTON BUREAU
(*Paul Wooton Chief*)

WASHINGTON—As Elmer Andrews arrives in Washington to organize his Standards Division in the Labor Department, he is met with almost unanimous approval of his appointment as Administrator of the wage-hour law, which takes effect October 24. But meanwhile, representatives of both labor and employers are not just sure how much "help" he will get from Secretary Perkins in organizing and running the new authority. This writer noticed, at Miss Perkins' press conference, that she said "we" and not "he" when answering questions about wage-hour administration. But students of labor say that Andrews has a slow-moving, thorough and determined mind of his own, and that he will steer his own course. They say he is much more likely to accept the advice of Labor's statistics expert, Dr. Isador Lubin, and that if there is any team-up it will be Andrews-Lubin.

Apparently only a few Southerners are displeased with Andrews' appointment. They fear he may turn out to be more "New England conscious" than would be good for the wage differentials on which a large section of southern industry depends. If Lubin is to have a hand in labor standards, that's pretty much to the good also. For though he leans far to the left, business accepts him as a man with high regard for facts and fair dealing. It is commonly thought here that Dr. Lubin could have been Administrator; that he thought the job might ruin its first incumbent; that he might take it later on.

Employer and employee interests by the scores are getting set to pile facts and figures into the industrial committees' laps to prove their cases. Southern industries are now securing more data to add to what they presented by truckloads in an effort to beat the wage-hour bill. Not the least among the surveyors will be the Administration itself; the Labor Department is cram full of Dr. Lubin's charts and tables which will be used.

Walsh-Healey Entanglements

Executives in the metal-working field are concerned also about the expanding scope of the Walsh-Healey public contracts act. The wage-hour Administrator cannot set wages higher than 40 cents, but the Labor Department's public contracts board can set "going wages." The two laws overlap and some ambitious lawyers suggest they tangle. But such appears not to be the case. The wage-hour law does not void any labor control law. It is possible that some equipment builders will stop bidding on government work. They cannot apply two wage scales—one for the commercial market and one for government work—and they believe freedom from Walsh-Healey rates would be worth more to them than profits from government jobs.

Two Six-Hour Shifts

The wage-hour law of course sets minimum wages too low to affect most employees in metal working. But the time-and-a-half for overtime provision applies. The industry's spokesmen here say that some plants may consider two six-hour shifts to avoid overtime costs and to get more production out of their investment in equipment. Andrews will begin by selecting two or three industries to be first on the operating tables. Metal working will not be one of them. The wage-hour law does not specify which employers are affected; it does not give the Administrator authority to select them; and its definition of interstate commerce is vague. Only a court decision can give the answer to a given industry. Some employers will be tempted to try their luck in court, but most will comply rather than risk prosecution.

Educational Orders

Washington hears that the first lot of educational orders under the new $2,000,000-a-year program will go to the automobile industry some time in September. The War Department has been working since Congress adjourned on an organization to administer the authorization. Brig. Gen. Henry Arnold, Assistant Chief of the Air Corps, chosen to head the staff which will negotiate orders, is okay with munitions men here. Aircraft people, of course, think he will lean their way, but others say he will take a lot of trouble not to.

Federal Ownership

Despite the famous efforts of former Chairman Joseph Kennedy, and millions of dollars for construction and operating subsidy almost on a giveaway basis, the Maritime Commission never was able to get any shipping company into a deal until American Export accepted four standard cargo vessels on which bids have been awarded to Bethlehem. All other construction has been for government account in hope it could be sold or chartered. Washington no longer expects anything but eventual federal ownership of foreign service.

LEWIS' PURGE FAILS

The metal-working industry have a keen interest in the outcome of the primaries this far, inasmuch as they will have a marked effect next year on what Congress will do in every conceivable legislative situation affecting labor, employment, business and taxes.

Most interesting is the total failure of John L. Lewis to "purge" the House Rules Committee, which last session and the year before stymied so many CIO sponsored and New Deal advocated bills, sometimes defeating them altogether and sometimes forcing modifications.

Defeat of New Deal candidate, William E. Dodd, Jr, by Howard W. Smith, right in the Virginia district where John L. Lewis now resides was most spectacular. Equally important was the return of Martin Dies, of Texas, who with five other Texas Democrats, including Hatton Sumners, had been marked for defeat by CIO. All five won, while Maury Maverick, considered the staunchest New Dealer and pro-CIO member of the House, was defeated. Texas also defeated one other pro-CIO congressman and forced a third to a run-off.

John O'Connor seems in no danger from the Rules Committee purge. Driver, of Arkansas, and Clark, of North Carolina, have already weathered their primaries; Cox, of Georgia, is still fighting, but news from his district is he will win easily.

June Machinery Exports Up 16 Per Cent

WASHINGTON—Valued at $23,203,415, exports of industrial machinery from the United States during June increased 16 per cent over corresponding shipments during June, 1937 according to the Machinery Division, Department of Commerce. Substantial advances were recorded during the month in three groups.

For the first six months, machinery exports total $142,216,348, a 28 per cent increase over the 1937 January-June figure of $111,176,031. Five of the seven groups shared in the January-June gains, with machine tools and power-generating equipment leading in the rate of increase. Power-driven metal-working equipment exports totaled $49,051,845 for the first six months of this year, a 77 per cent increase over the $27,769,774 total for the same period last year. Other metal-working equipment showed a 15 per cent gain during the same period, with a total of $2,506,088 as against $2,168,789 last year.

Greatly increased shipments to Russia and Japan have been a major factor in the improvement in machine tools exports. During the first five months of this year American machine tool shipments to Russia totaled $10,796,127 and to Japan $8,194,220, compared with $1,950,031 and $2,931,784, respectively, during the same period last year.

Overseas consignments of power-driven metal-working machinery in June were 69 per cent greater than a year ago, with a total of $8,000,189 as against $4,731,173 for 1937. Most types of this equipment shared in the gain, the major increases including: lathes, $1,400,693 against $581,414; milling machines, $1,183,315 against $468,110; planers and shapers, $253,730 against $58,997; surface grinders, $152,512 against $79,478; external cylindrical grinders, $647,472 against $112,385; sheet and plate metal working machinery, $533,456 against $282,901; forging machinery and parts, $406,142 against $130,855; and foundry and molding equipment and parts, $234,613 against $85,307. The exports of other than power-driven metal-working machinery, valued at $320,866, were 11 per cent lower than the $360,754 figure for June, 1937.

Exports of Machinery During June, 1938

	June 1938	May 1938	June 1937
Electrical machinery	$8,342,535	$8,552,312	$9,171,696
Power generating machinery except automotive and electric	1,441,628	1,573,948	1,067,787
Construction and conveying machinery	2,047,131	1,995,429	2,151,078
Mining, well and pumping machinery	6,419,375	5,680,304	4,574,390
Power driven, metal-working machinery	8,000,189	9,078,953	4,731,173
Other metal-working machinery	320,866	371,695	360,754
Textile machinery	598,970	491,856	937,884

Exports of Metal Working Machinery During June, 1938

Engine lathes	$587,931	$710,065	$232,191
Turret lathes	647,311	407,699	251,392
Other lathes	165,451	209,121	97,831
Vertical boring mills and chucking machines	294,616	594,354	319,097
Thread cutting and automatic screw machines	384,264	422,314	354,322
Knee and column type milling machines	410,894	802,895	226,220
Other milling machines	772,421	591,101	241,890
Gear-cutting machines	349,261	313,078	287,123
Vertical drilling machines	93,886	96,031	83,850
Radial drilling machines	43,698	60,542	46,056
Other drilling machines	171,286	261,285	79,868
Planers and shapers	253,730	270,774	58,997
Surface grinding machines	152,512	218,360	79,478
External cylindrical grinding machines	647,472	378,183	112,385
Internal grinding machines	225,627	425,226	193,430
Tool grinding, cutter grinding, and universal grinding machines	185,043	285,429	212,744
Other metal-grinding machines and parts	136,248	342,771	71,786
Sheet and plate metal-working machines and parts	533,456	694,228	282,901
Forging machinery and parts	406,142	303,114	130,855
Rolling mill machinery and parts	737,569	549,104	766,682
Foundry and molding equipment and parts	234,613	192,051	85,307
Other power-driven metal-working machinery and parts	566,818	951,228	516,768

Other Metal-Working Machinery

Pneumatic portable tools	97,976	124,009	116,762
Portable and hand and foot operated metal-working machines and parts	134,143	107,902	103,709
Chucks for machine tools	18,856	19,323	21,539
Milling cutters, machinery operated threading dies and Milling cutters, machinery operated threading dies and taps and similar machinery operated metal cutting tools	42,995	79,500	54,664
Other metal-working machine tools	26,896	40,961	64,080

Foreign Demand Continues For U. S. Machinery

NEW YORK—Reports indicate that the demand of Greek importers for American industrial and farm machinery during the early part of 1938 led the Ministry of National Economy to authorize additional machinery import permits during the months of April and May. Most of the additional permits were for farm machinery, but this has benefited the industrial machinery market by relieving the demand on the basic monthly allotment. It is said that the general demand for American machinery of all kinds still is growing, and it is not unlikely that import applications will accumulate again. Hope has been expressed that the precedent of extra allotments will be followed in order to keep applications on a reasonably current basis.

According to reliable sources Seihin Ikeda, whose appointment to the two key Japanese cabinet portfolios of Minister of Finance and of Commerce and Industry was reported in these pages recently, has decided to let traders know in advance the estimated amount of import exchange that will be permitted. This will enable the importers to enter into contracts with foreign firms a few months ahead and take advantage of the most favorable quotations by forward buying. Now, traders find it necessary to buy at prices quoted when the exchange license actually is issued.

Scattered orders for various types of metal-working and other machinery continue to be placed by buyers in Central and South American countries. Local exporters report that there has been little change in this field during the past three months, but feel that the difficulty some of their clients have experienced with exchange restrictions imposed by some European countries is reacting in favor of American manufacturers. Better U. S. deliveries and the hesitancy of German suppliers to specify definite deliveries of manufactured iron and steel products, as well as rising German prices, also have improved foreign trade possibilities with all of the Latin-American countries.

Ultimate result of the publicized shift of activities of the Export-Import Bank, so as to finance U. S. trade with South America, is hard to judge at this time. Most of the business placed during recent months has, according to an exporter familiar with that field, been financed locally with little difficulty.

DETROIT LETTER

Late summer sales of cars are surprisingly good . . . Farm states lead in buying . . . Most makers will display new models before show time . . . Parts suppliers have received first releases . . . G.M. to operate new plants

DETROIT—Things are looking up in the automotive world. The industry is in the midst of retooling for 1939 models, with factory operations at a pretty low point, but retail sales have shown far more strength than sales executives anticipated. Contrary to the usual seasonal downward trend, several companies reported retail deliveries late in July ahead of those in the same period in June.

Production of cars this year has been closely geared to retail demand. In fact, some companies have built fewer cars than they have sold since January 1, thus cutting down new car inventories considerably. With sales holding at a fair level through midsummer, the industry is likely to enter the '39 season with dealers well stripped of 1938 models. The dealer situation, in fact, will be much better than it was in the Fall of 1937 when many dealers went into the '38 model year burdened with unsold 1937 cars.

The strengthened position of the industry can be traced partly to the amount of buying done in the farming areas of the Middle West. Sales declined far less than the national average in the farming states of Kansas, Iowa, Missouri, Nebraska. Kansas made the outstanding record in June by passing its 1937 total for that month. Car manufacturers, incidentally, are looking to the farming regions to take a substantial share of the 1939 cars produced. Farm income this year is down much less than the factory worker's income, and new car purchases by farmers in the fourth quarter should be good.

The "turn-around" in retail car demand, with sales sustained at higher levels than expected, has led car companies to revise their plans for new model introductions. There will be some speeding up of what at first was intended to be a leisurely process. Announcements at one time were scheduled for late October or around show time, but they have been moved forward. Chrysler will be among the first to reveal its new lines. A press preview of Plymouth, Dodge, DeSoto and Chrysler is set for August 19 with public introductions likely in September. Packard should be out fairly early, just as it has been in recent years. Buick, as usual, will be the first General Motors division to start a 1939 sales drive.

There will not be a rush, however, to bring cars on the market too far in advance of the New York Show which will begin on November 11. There probably will be a number of October announcements with most companies having formally presented their lines prior to show time.

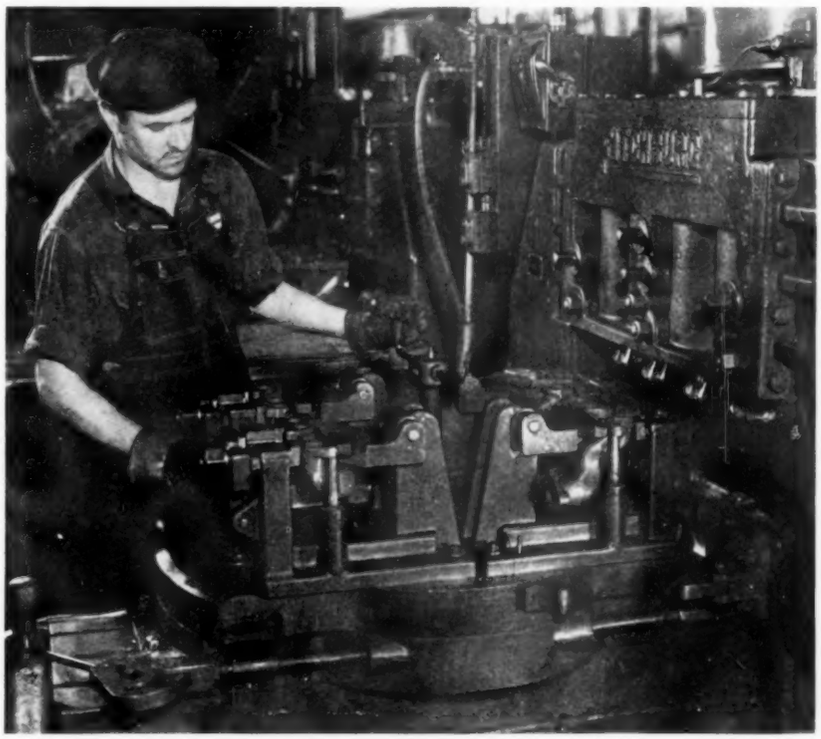
Parts manufacture for 1939 cars has begun on a modest scale. Factories at Detroit, Toledo and Dayton, Ohio, have received releases of materials and have recalled workers. However, production will not reach sizable volume for some weeks. Purchases of steel for the first batch of cars to be turned out this Fall is expected this month.

Though August is the low spot of the year from the standpoint of production, surprisingly enough 1939 assemblies will get under way this month.

With the coming of a new automotive year, General Motors will put into operation several new plants which have been in the course of construction for the last year or longer. These plants are in the East. Originally it was planned to rush them to completion, but that was back in the big days of '37. When the automotive market "went to pot" last Fall, orders were issued to loaf along on the erection and equipping of these plants.

Diesel engines for buess have come to the front in the last two months. General Motors Truck has received two large orders for them, hydraulic torque converters being combined with diesel power.

Ford is reported to be planning a late start for the 1939 season. It will be building '38 cars well into September before closing for retooling. A new Ford car of 116-in. wheelbase is said to be ready for the Fall market.



Mounting for Manifolds—Faces of the Plymouth exhaust manifold for all six cylinders are machined at once by this recently installed milling machine. The special design includes duplicate mountings on a revolving table, so the cutters can be working on one manifold while the operator loads another

Jap Machine Tools Restricted To Munitions Manufacturers

TOKYO—With a view to securing a quick expansion in the productive capacity of the munitions industry, the Department of Commerce and Industry, Tokyo, has announced its intention to prohibit the manufacture of machine tools for purposes other than munitions production. The Government can exert immediate pressure on uncooperative manufacturers by withholding their supplies of necessary raw materials.

Machine tool exports into North China will be banned except when specifically endorsed by the Japanese military authorities. This will be welcome news to foreign firms serving this region, who are already at a competitive disadvantage due to their high freight charges and to their difficulty in handling the currency of the Japanese-sponsored Federated Reserve Bank.

Considerable anxiety is being felt by both makers and users of machine tools as to how to deal with the inexperienced and otherwise unqualified machine tool makers who have popped up after the outbreak of the China conflict, turning out equipment entirely incapable of withstanding normal working use. In spite of the acute tool shortage, the allotment of iron and steel to such makers is considered inconsistent with Government policy by the Ministry of Commerce and Industry. Since this enormously lowers the standards of the Japanese-made machine tool, the Ministry is expected to adopt some definite measure to cope with the situation.

Imports Up

According to an official forecast, total imports for 1938 are expected to exceed those of 1937 by a considerable margin, despite the strained exchange situation and the fact that the 1937 record was in itself an all-time high. However, imported milling machines have largely been replaced by domestic products, and it is expected that imports of millers will soon be prohibited by the exchange authorities.

Cutting tools, gages and similar small articles which are imported license-free under a $29-a-month limit are sold at prices which are up to 500 per cent above their import value. Some American manufacturers of these articles are planning to abolish exclusive agency rights in Japan in order to spread the business over a larger number of importer-consumers.

The tangible effect of Italian competition in Japan is reflected by a tripartite trade accord recently signed at Tokyo between Italy, Japan and Manchukuo. Although the text has not yet been made public, it is understood that: (1) Trade is to be on a barter basis; (2) Combined Japan-Manchukuo exports to Italy will be set at $8,000,000; (3) For the same amount Japan and Manchukuo will buy Italian machinery and automobiles.

Stevens Starts Graduate Course

The Stevens Institute of Technology, of Hoboken, New Jersey, is offering for the first time a program of evening graduate courses. To meet the needs of graduate engineers employed in the metropolitan area, the Institute is offering courses in mechanical engineering, electrical engineering (specializing in communication), and economics of engineering. Inquiries should be addressed to Professor Frank C. Stockwell, Committee on Graduate Instruction, Stevens Institute of Technology, Hoboken, New Jersey.

Porcelain Enamel Institute To Hold Forum

CHICAGO—F. E. Hodek, Jr., of the General Porcelain Enameling and Manufacturing Company, chairman of the Forum Committee and president of the Porcelain Enamel Institute, reports that the program for the Institutes's Third Annual Forum is practically complete. The Forum will be held at the University of Illinois on October 12, 13 and 14.

The tentative subjects for discussion are as follows:

On Wednesday, October 12, the Forum will devote itself to a review of the industry, discussion on the Institute and the plant man, to be followed by attendance at a lighting exhibit.

Thursday will be devoted to discussions of tests for abrasion resistance, sag resistance properties of enameling iron, methods for testing enamel stock, ball milling practice and enamel shop waste.

Friday morning will be devoted to divisional sessions on hollow ware, cast iron and sheet iron. Friday afternoon will include a general session, which will feature discussion of automatic spraying and brushing equipment, automatic welding and relationship of welding practices to enameling defects.

A.S.M.E. Forms Committee To Study Non-Metallic Materials

The American Society of Mechanical Engineers announces the formation of a committee, or subdivision, to deal with several phases of the rubber and plastics industries. These will include mechanical applications, research on basic mechanical properties, processing equipment, and standards. Activities of the group will be beyond the normal range of other professional organizations in an effort to fill the present conspicuous gap in the field of rubber and plastics.

A symposium on rubber will be sponsored by the committee at the Fall meeting of the Society, to be held in Providence, October 5–7.

The papers to be presented at this meeting will particularly emphasize mechanical problems in the production and use of rubber. As scheduled at present, these will be:

The Engineering History of Rubber, by Dr. W. C. Geer, Ithaca, N. Y.

Synthetic Substances with Rubber-like Properties, by E. R. Bridgwater, E. I. Du Pont De Nemours & Co., Wilmington, Del.

Problems in the Production of Rubber, by E. G. Kimmich, Goodyear Tire & Rubber Co., Akron, Ohio.

The Mechanical Characteristics of Rubber, by F. L. Haushalter, B. F. Goodrich Co., Akron, Ohio.

The committee on rubber and plastics will meet in the evening of Oct. 5 to discuss projects for 1939 and 1940. Technical representatives of companies engaged in either the production or use of rubber and plastics are invited to attend.

To Collect Iron Data

The Gray Iron Founder's Society, Inc. has started a critical study of the world's technical literature on the properties of gray iron. W. W. Rose, executive vice-president of the Society, states that it is planned to present the data in a form particularly adapted to the needs of the sales and service organization of the member foundries.

N.A.M. Appoints Dr. Heiser As Research Director

NEW YORK—The National Association of Manufacturers has named Dr. Victor G. Heiser research director of the Association's committee on healthful working conditions. The appointment was announced on Aug. 3 by Colby M. Chester, chairman of the executive committee.

Frank Purnell, president of the Youngstown Sheet and Tube Co., is chairman of the health committee. At the same time Mr. Chester announced that Donald M. Shafer, a graduate of the Cornell University Medical School, would be assistant to Dr. Heiser. He was formerly associated with the Medical Department of the Standard Oil Company of New Jersey at the Bayonne, New Jersey, refineries, and has been house physician and surgeon at the Staten Island (N. Y.) Hospital.

Dr. Heiser announced that an advisory committee of experts in the field of healthful working conditions would be selected from various companies to plan out and advise the committee on healthful working conditions. This advisory committee will be under the chairmanship of Dr. W. Irving Clark, of the Norton Company, Worcester, Massachusetts.

One of the major objectives of the recently organized committee will be to extend health benefits developed in large manufacturing plants to smaller companies. Through the surveys planned, the committee expects to help some 80,000 smaller plants.

Dr. Heiser, widely-traveled author of "An American Doctor's Odyssey," asserts that despite efforts to reduce employee injury and illness many of the smaller industrial units have fallen far behind.

PERSONALS

WILLIAM W. BOND has been appointed Western Sales Manager of the Positive Drive Division, Link-Belt Co. The company also announces that RALPH S. DYSON, for many years manager of stock silent and roller chain drives through distributors, will also head up roller chain sales to duplicate machinery manufacturers.

EDWARD S. COE, JR. has been transferred from the Buffalo plant to the Chicago sales office of the Farrel-Birmingham Company, Inc. Mr. Coe will be in charge of sales of Farrel-Sykes herringbone gears and gear units in the Chicago area.

ARTHUR A. DAY, after 46 years with the Buffalo Forge Co., has retired to his farm outside the city of Buffalo.

LUDWIG EMDE has been appointed Detroit district sales manager for the Worthington Pump and Machinery Corporation of Harrison, New Jersey. Mr. Ludwig will succeed WILLIAM J. DALY, recently transferred to the corporation's Philadelphia office as manager.

MELVIN B. ERICSON, was elected president, Pettibone-Mulliken Corp., manufacturer of railroad equipment, castings and pumps.

WILLIAM FINKL has been named president, A. Finkl & Sons, hammered and pressed forgings, Chicago. He succeeds ANTON FINKL, deceased. FRED FINKL is vice-president; FRANK FINKL, treasurer, and C. A. MORRWAN, secretary.

JOHN H. GOSS, executive vice-president and general manager of the Scovill Manufacturing Co., has been named president and general manager. He succeeds the late Edward Otis Goss, who died five weeks ago. LEAVENWORTH P. SPERRY, treasurer, has been made executive vice-president, while still retaining his position as treasurer.

The appointments of J. W. HUTCHINS and EMERSON J. POAG as assistant general sales managers were announced recently by Forest H. Akers, vice-president of the Dodge Division of Chrysler Corporation. Mr. Hutchins was formerly manager of the New York region of the Dodge organization, while Mr. Poag has long served as the director of Dodge merchandising and advertising

HENRY FORD accepted the honorary chairmanship of the advisory board of the Society of Automotive Engineers, Inc. Mr. Ford praised the Society's plan for a world automotive engineering conference scheduled to be held during May and June of 1939.

HOMER KENDALL, formerly associated with the Alliance Machine Co., has been appointed to handle special engineering problems in sales work with the Salem Engineering Co.

JOHN K. NORTHRUP, former military airplane manufacturer, who retired recently as vice-president of the Douglas Aircraft Corporation, is now vice-president of the Northill Company, Inc., of Glendale, California. The Northill Company is an American-English organization possessing exclusive American manufacturing and sales rights for the Covic diesel engine, now manufactured in England for marine, automotive and stationary uses.

P. M. STEPHENSON has been elected vice-president and will act as manager of Brewster Aircraft Parts, a new division of the Brewster Aeronautical Corp.

JAMES SUTTIE has been named general manager in charge of production and sales, American Steel Foundries, Chicago.

ERNEST F. TALMAGE, for the past eighteen months western sales manager, Braeburn Alloy Steel Corp., has joined the sales organization of Youngstown Sheet & Tube Co. in Chicago. Prior to his association with Braeburn he was district sales manager of Timken Steel & Tube Co. and before that he was with Pittsburgh Crucible Steel Co.

L. M. VILES, president for more than twenty years, was elected chairman of the board, The Buda Co. J. S. DEMPSEY who has been with the company many years as secretary, treasurer and vice-president succeeds Mr. Viles as president. R. K. MANGAN and E. D. CONANT, operating vice-presidents, and Mr. Dempsey form an executive committee to direct the affairs of the company.

A. C. SPARK PLUG Division, General Motors Corp., announces the appointment of L. C. Goad as general manager to succeed F. S. Kimmerling who is taking leave of absence because of ill health.

C. D. PROCTOR Co., of New York, has been appointed exclusive representatives in the New York territory for the sale of Omer E. Robbins Company's *Magna-Sine*, a magnetic chuck for grinding single or compound angles.

P. Y. DANLEY has been named manager of the new Westinghouse air conditioning department to be established at the company's East Springfield plant. S. F. Myers has been appointed assistant manager of the new department, with headquarters in Chicago. Mr. Danley has appointed H. F. Hildreth to direct the sale of home air conditioning equipment from the department's headquarters in East Springfield.

BUSINESS ITEMS

The Atlantic Refining Co. has awarded the Worthington Pump and Machinery Corporation the contract for the cargo discharge and circulating pumps for a third 18,500-ton welded tanker to be built at the Sun Shipyards, Chester, Pa.

The Bethlehem Shipbuilding Corporation, Ltd., was recently awarded a Navy Department contract for the construction of three fleet tugs at Staten Island, New York.

The Blaw-Knox Co., through its Power Piping Division, is completing the installation of about 60 miles of piping in the new Irvin Works of the Carnegie-Illinois Steel Corporation. Most of the lines were prefabricated to facilitate field work, with all sections being joined by electric welding wherever possible.

A $200,000 addition to the plant of the Owens-Illinois Can Co. will double their present plant area.

The R. G. Haskins Co., 4636 W. Fulton St., and Paul Oehmig & Co., paint machinery, 615 S. California Ave., Chicago, have traded plants. The exchange gives the Haskins Company needed additional floor space.

Skilsaw, Inc., electric tools, has begun construction of its new $90,000 factory and office building at 5033-43 Elston Ave., Chicago.

The Carnegie-Illinois Steel Corporation has announced the appointment of Elmer E. Erickson as manager of the bureau of sales statistics. Mr. Erickson was formerly assistant manager of the bureau.

Fairbanks, Morse & Co. has been awarded a Navy Department contract for two complete sets of main propelling machinery for two new mine sweepers to be constructed at the Norfolk, Virginia, Navy Yard.

The General Electric Co. will supply the motors and control, as well as the auxiliary equipment, for an experimental light weight subway car to be placed in service by the B.-M. T. in New York City. The car, constructed largely of aluminum alloys, will be streamlined and articulated. Air brakes, dynamic braking and magnetic traction brakes are included in the construction.

The Norma-Hoffmann Bearings Corporation, Stamford, Conn., due to an increasing demand for its ball, roller and thrust bearings, has just completed an extension to its present buildings and has placed substantial orders for new machine tool equipment.

Oakite Products, Inc., manufacturers of industrial cleaning materials, announce the transfer to Detroit of H. C. DUGGAN, New England division manager, where he will serve as Detroit division manager. As a result of this change, the company's New England division will be combined with the New York division under the management of D. X. CLARIN.

Philco Radio & Television Corp. has leased a one-story factory building with 40,000 sq. ft. area and a two story office addition at 1238 N. Kostner Ave., Chicago.

The Taft-Peirce Manufacturing Co. of Woonsocket, Rhode Island, announces the promotion of George C. Smith to the post of Chicago District Sales Representative of the company's Small Tool Division.

OBITUARIES

John E. Edgerton Dies

JOHN E. EDGERTON, president of the Lebanon Woolen Mills and former president of the National Association of Manufacturers, died August 4 at his home in Lebanon, Tennessee.

Mr. Edgerton was graduated from Vanderbilt University in 1902, after which he helped found the Columbia Military Academy, of which he was co-principal until 1912, when he began his career as a manufacturer.

By 1915 he was head of the Tennessee Manufacturers Association, and in 1916 was made director-at-large of the National Association of Manufacturers. In 1921 he was elected president of the latter organization, a post which he held until 1931, when he resigned and became chairman of the board.

Mr. Edgerton has constantly been active in national affairs on behalf of his fellow manufacturers. He was a member of President Harding's committee on unemployment, and under President Hoover was a member of the National Re-employment Committee and the National Reconstruction Conference. Under President Roosvelt he headed the Southern States Industrial Council and was outspoken in his attacks on the New Deal in general and N.R.A. in particular. The loss of his leadership will be particularly felt throughout the South.

F. A. LORENZ, JR.

F. A. LORENZ, JR., vice-president, American Steel Foundries, and widely known engineer died July 23 at the age of 52. Mr. Lorenz graduated from University of Illinois in 1909 and began work as inspection engineer with the Chicago & North Western R.R. He then became superintendent of the East Chicago rolling mill, Republic Steel Co. He joined American Steel Foundries in 1911.

The American Foundrymen's Association of which he was a director recently awarded him the Seaman medal and a life membership for outstanding contributions to steel foundry operating methods. Mr. Lorenz had also been president of the Steel Founders Society of America for the past five years.

HERBERT MYGATT WILCOX, manager of the New Products Dvision of the Westinghouse Electric and Manufacturing Company, died suddenly from heart disease on July 28 while in New York City on business.

Mr. Wilcox was born in Pittsburgh, Pennsylvania, in 1882. After attending Princeton university from 1900 to 1902 he transferred to the Massachusetts Institute of Technology from which he graduated in 1905. In 1914 he joined the Winchester Repeating Arms Co. where he served as an industrial engineer until 1925 when he became commercial manager for the Western Electric Co. When the latter company created Electrical Research Products, Inc., Mr. Wilcox was made vice-president in charge of operations. In 1936 he resigned to join Paramount Pictures Corporation and the following year came to Westinghouse.

WILLIAM F. EBBING, president, Detroit Edge Tool Co., died August 2 after an illness of six months. He was 63 years old.

ALBERT A. GECK, of the Breckenridge Machine Co., Cleveland, Ohio, died July 17.

LOUIS C. LOEWENSTEIN, prominent consulting engineer, died suddenly of a heart attack in New York City on Aug 3.

Dr. Loewenstein had been a designing engineer for the William Cram & Sons Ship and Engine Building Co. and for the New York Shipbuilding Co. He had also served as a consulting engineer to the General Electric Co. and as a consulting expert to the Department of Justice. He had been granted more than 200 patents.

HENRY LAIDLAW, of the Worthington Pump & Machinery Corp., died in Canada on June 25 of a heart ailment. When the International Steam Pump Co. was formed in 1898 he became sales manager of the company's Detroit district office.

ALEX PAULSEN, district sales manager, Harnischfeger Corp., died at his home in Milwaukee, August 3. He was 50 years old and had been an employee of the firm for 30 years.

MEETINGS

AMERICAN IRON AND STEEL INSTITUTE and AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS. Joint Meeting with two British Institutes: THE IRON AND STEEL INSTITUTE and THE INSTITUTE OF METALS, HOTEL WALDORF-Astoria, New York City, beginning Oct. 3.

AMERICAN SOCIETY FOR METALS. Twentieth Annual Metal Show and Exhibition. Convention Hall, Detroit, Oct. 17–21. W. H. EISENMAN, secretary, 1016 Euclid Ave., Cleveland, Ohio.

AMERICAN SOCIETY OF TOOL ENGINEERS. Semi-annual meeting, Oct. 14–15. Pittsburgh, Pa.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION. Sixteenth annual conference, Sept. 21–23. Statler Hotel, Cleveland. Committee chairman, STANLEY A. KNISELY, advertising director, Republic Steel Corp.

NATIONAL SAFETY COUNCIL. National Safety Congress, Oct. 10–14. Stevens Hotel, Chicago.

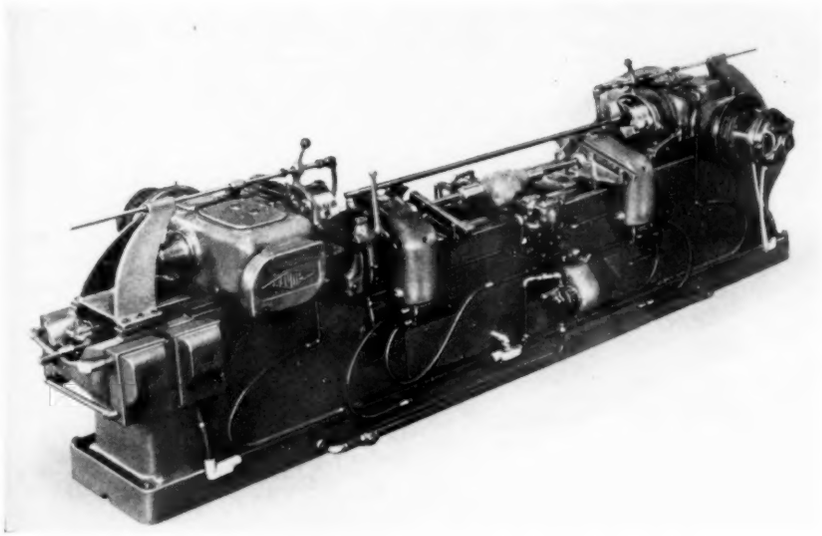
NATIONAL SMALL BUSINESS MEN'S ASSOCIATION, Pittsburgh, Pa., September 13–16.

SEVENTH INTERNATIONAL MANAGEMENT CONGRESS, Washington, D. C. Sept. 19–23.

SOCIETY OF AUTOMOTIVE ENGINEERS. National Aircraft Production Meeting, Oct. 13–15. Ambassador Hotel, Los Angeles, Calif.

National Truck, Bus and Railcar Meeting, Oct. 4 and 5 Chicago, Illinois.

SHOP EQUIPMENT NEWS



"Lanhydro" Double-End Threading Machine

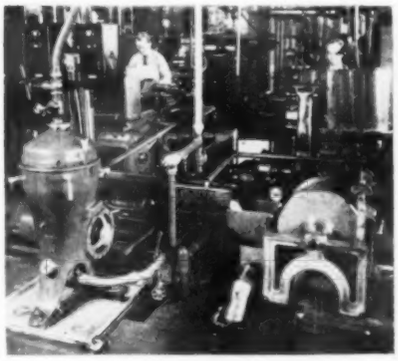
Landis Machine Co., Inc., Waynesboro, Pa., offers the hydraulically operated "Lanhydro" double-end threading machine for cutting threads simultaneously on both ends of tie rods and short bars. When in operation, this machine passes through the following cycle: the operator places the work to be threaded on the work supports, positioning it in the open gripper bars by bringing the end of the work in contact with a work stop. He then actuates the main control valves by a hand lever, thus closing the gripper jaws. The work stop then raises to clear the threading unit and both threading units advance rapidly to a pre-determined point at which the chasers are just clear of the ends of the work. At this point, the threading units drop into a threading feed which continues for the duration of the threading operation. Opening of the threading heads is controlled by yokes and trip rods on each unit. Upon completion of the cut, the opening action of the die head shifts a valve which causes the heads to return at high speed to the rest position.

Return movement of the threading units closes the die heads automatically and operates a valve which opens the gripper jaws. Work ejector cylinder then is actuated and the work stop is lowered. Entire hydraulic system is interlocked so that no movement can take place before each preceding movement in the cycle is completed. Cutting speed of each threading unit is controlled independently by pick-off type gear boxes and a wide variable in spindle speeds is available. Bars ranging from ½ to 2 in. in diameter can be threaded. The machine shown will thread bars ranging from 50 to 78½ in. long, but the maximum length can be increased to 10 ft. if desired. Maximum travel of threading head units is 22 in.

DeLaval System For Clarifying Coolant

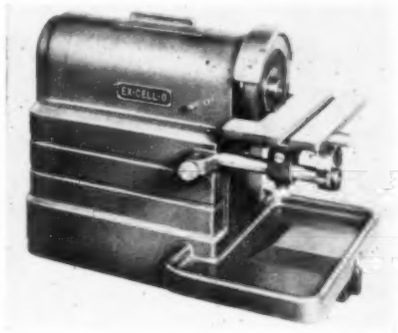
A system consisting primarily of a magnetic extractor and a centrifugal clarifier has been developed by the DeLaval Separator Co., Poughkeepsie, N. Y., for clarifying coolants, particularly those used in grinders. Coolant coming from the machines first passes the magnetic extractor where material of a magnetic nature clings to the drum and is scooped off by revolving blades into a box. After passing the extractor, the return coolant is pumped to a small settling tank. The extractor is said to remove practically all of the steel particles, which form the greatest menace to smooth finish in grinding.

Coolant then is pumped into the bottom of the hollow spindle of the clarifier at about 40 lb. pressure. This delivers the coolant into the separator bowl where all remaining non-magnetic particles, such as grit and bond from the ginding wheels are thrown out and collected in the bowl. The coolant flows out of the separator at the top and back to the machines without coming in contact with the air during the purifying process.



Ex-Cell-O Carbide Tool Grinder

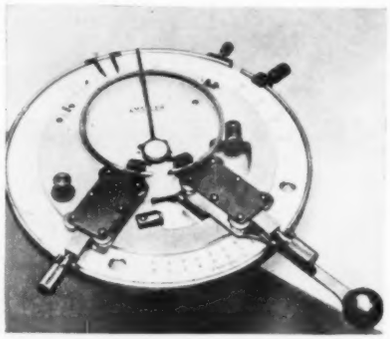
An improved carbide tool grinder which can be used for wet grinding with diamond impregnated wheels has been announced by Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit, Mich. This is a single-end, self-contained motor driven grinder equipped with a ball-bearing spindle and a



built-in coolant reservoir. A completely adjustable table with angle-setting dial and protractor permit grinding the sides, radii and angles of round and rectangular right- and left-hand tools. Specifications: overall height, 14¾ in.; width, 13½ in.; depth, 20⅝ in.; distance from bottom of base to center of spindle, 11⅜ in.; driving motor, ¼ hp.; net weight, 135 lb.

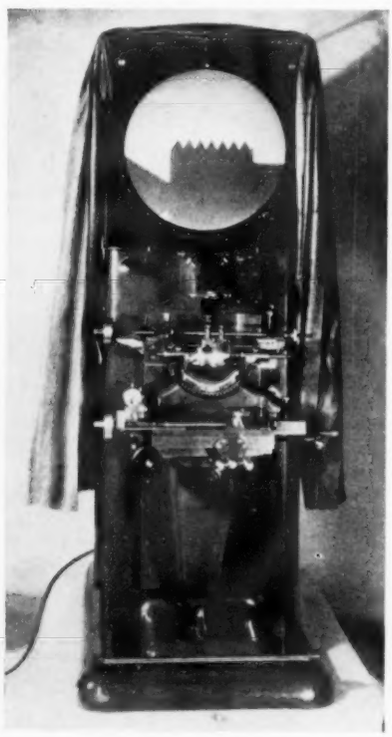
Amsler Type K 337 Piston Ring Tester

A constant bending moment distributed over the entire circumference of the ring is used in the Amsler Type K 337 piston ring tester offered by Herman A. Holz, 167 E. 33rd St., New York, N. Y. A simple formula expresses the relation between the bending moment as shown by the apparatus and the lateral pressure which is exerted against the cylinder wall by the piston ring under working conditions. The apparatus consists of two parts: the loading or ring closing and opening device, and the measuring device. The former consists of a lever carrying a vise which moves around a fulcrum at the center of the apparatus. One end of the ring is gripped in the vise of this loading device. The other end is held in a similar vise fixed to a disk which is fitted to the upper end of a calibrated elastic bar.



Bausch & Lomb Contour Measuring Projector

The improved inclosed-type contour measuring projector announced by the Bausch & Lomb Optical Co., Rochester, N. Y., has a full 18 in. screen and can be furnished with lenses giving 10X, 25X, 31¼X, 50X, 62½X and 100X magnifications. Other magnifications between 10X and 100X are available upon special order. The machine occupies a space of approximately 65 x 98 in., including room for the operator and doors. Lens system is of special construction, designed to give precision in imagery and to hold the size of the image independent of the sharpness with which it is focused on the screen to such an extent that errors due to poor focusing are said to be negligible.



Screens may be interchanged readily. An 18 x 18 in. ground glass screen can be used to observe the image of any part to be reproduced. Sketches on translucent paper can be attached to the plain screen by means of Scotch tape. An 18 in. diameter protractor screen is used to measure angles. This screen consists of a circular disk of ground glass mounted in a ring which is graduated in ½ deg. divisions. A double vernier for angle measurement to 1 min. of arc is provided. The 18 x 18 in. book screen consists of a pair of frames hinged together and each containing a clear plate of glass. Drawings to scale may be placed between these glasses. An 8 x 10 in. photographic plate holder may be placed in a suitable frame available as an accessory. A water cell is available for mounting in the beam of light before it reaches the object to protect the object in those cases where the negligible heat from the unmodified beam of light may cause distortions. A surface illuminator is used to examine parts of an object that may be hidden by other parts or for examining the surface of the object.

G-R Model 15 Arc Welder

Measuring 22 in. high, 14 in. wide and 15 in. long, the Model 15 transformer-type a.c. arc welder offered by Glenn-Roberts Co., Inc., 1009 Fruitvale Ave., Oakland, Calif., weighs 140 lb. This welder operates on single phase, 60 cycle circuits and is rated at 68 amp. for 110 volts and 30 amp. at 220 volts. Output ranges

from 15 to 125 amp. with an open circuit voltage of 60 and a welding voltage of 20 to 30. The unit is mounted on rubber-wheeled casters and has handles for carrying.

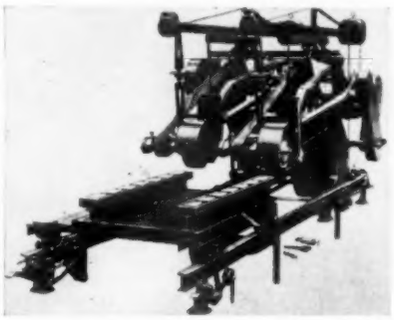
Link-Belt Shafer Roller Bearings

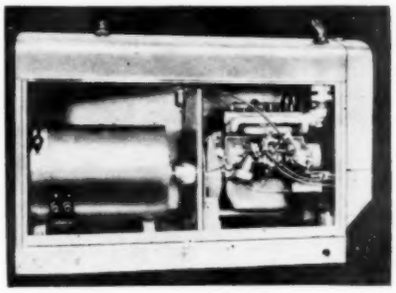
A complete line of Shafer radial-thrust, single-row and double-row roller bearings in unmounted form have been announced by Link-Belt

Co., 307 N. Michigan Ave., Chicago, Ill. It is claimed that these bearings have a free-rolling action even in the presence of shaft deflection or misalignment. Thrust capacity is provided by the roller and race-way shapes. Booklet No. 1652, which lists and describes these bearings, gives engineering data for calculating applications.

Excelsior No. 27-E Two-Spindle Grinder

Developed for surface grinding and polishing operations, the No. 27-E automatic two-spindle grinder offered by Excelsior Tool & Machine Co., 32nd St. and Ridge Ave., East St. Louis, Ill., has an oscillating side motion for the carriage. Carriage travel is 30 ft. per min. Spindle speed is 2,500 r.p.m. and spindles are arranged for 14-in. diameter wheels. A 15-hp., 750 r.p.m. motor drives the machine, which weighs 6,500 lb.





P. & H. 200-Amp. "Special" Arc Welder

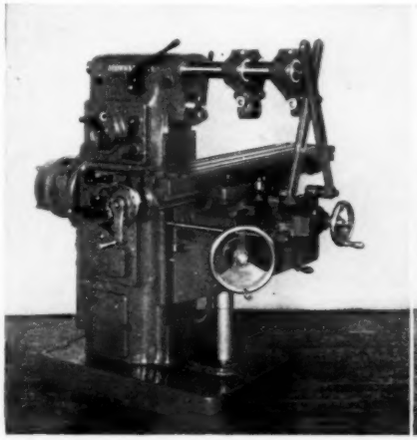
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., has developed the P. & H.-Hansen 200-Amp. "Special" engine-driven welder, which consists of a 200-Amp., 30-volt, 6 kw. generator connected by flexible couplings to a 24-hr., 4-cylinder water-cooled gasoline engine, for general applications. This welder will handle electrodes up to $\frac{7}{32}$-in. diameter under continuous manual operation.

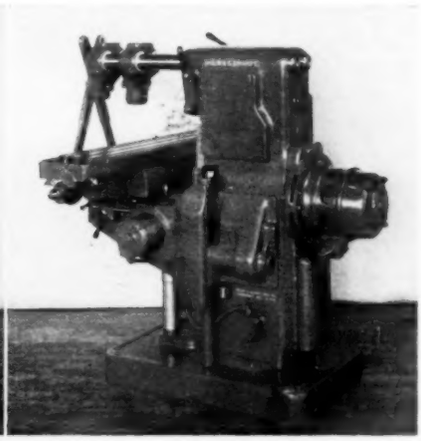
Brown & Sharpe No. 2 Light Type Universal and Plain Milling Machines

Equipped with power fast travel, the No. 2 light-type universal and plain milling machines announced by Brown & Sharpe Mfg. Co., Providence, R. I., have a longitudinal feed of 28 in., a transverse feed of 10 in., and a vertical feed of 15 in. All feeds are automatic and transverse and vertical adjustment hand wheels are each automatically disengaged when power feed in the respective direction is engaged.

A totally-inclosed, constant-feed motor built into the side of the knee provides power fast travel of 76 in. per min. in all directions. This fast travel is obtained in any direction of feed engagement by touching a switch button at the front of the knee. When the button is released, the table resumes its original feed movement.

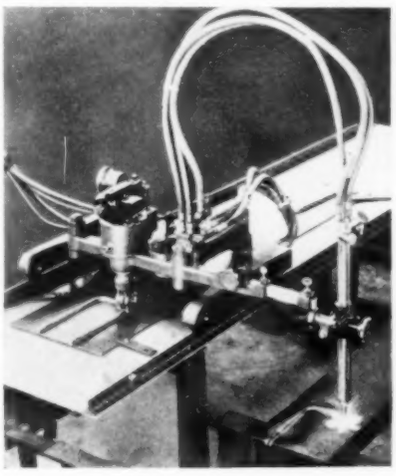
An automatic lubrication system in the knee provides intermittent oiling for all mechanisms in the knee, while the table driving mechanisms, table ways and bearing surfaces at the top of the knee are lubricated at each movement of the longitudinal feed engagement lever. On the universal type machines, centers swing 10 in. in diameter and will take a piece 28 in. long.





Oxweld Type CM-15 Portable Shape Cutter

Type CM-15 "Oxweld" portable shape-cutting machine announced by the Linde Air Products Co., 30 E. 42nd St., New York, N. Y., weighs less than 200 lb. and has a maximum range of blowpipe movement of 60 in. lengthwise and 18 in. laterally.

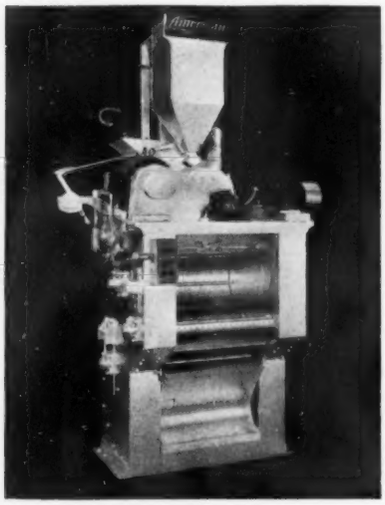


Cutting speed can be varied from $3\frac{1}{2}$ to 28 in. per min., and a speedometer indicates movement directly in inches per minute. Templet-tracing, hand-tracing, automatic circle-cutting, beveling and straight-line cutting operations can be performed with this machine.

Homestead Model K "Hypressure Jenny"

Model K "Hypressure Jenny" steam vapor spray cleaners announced by Homestead Valve Mfg. Co., Coraopolis, Pa., are made in portable and stationary types and either type may be had with nozzle control if desired. A vaporizing oil burner together with a spiral-coil type vapor generator is used to produce the steam required by this unit. Pressure control is ad-

justable from 50 to 125 lb. per sq. in. Oil and water pumps are combined in a single unit. Similar in design, the Model J unit is a portable, fully automatic unit with electric ignition and nozzle control.

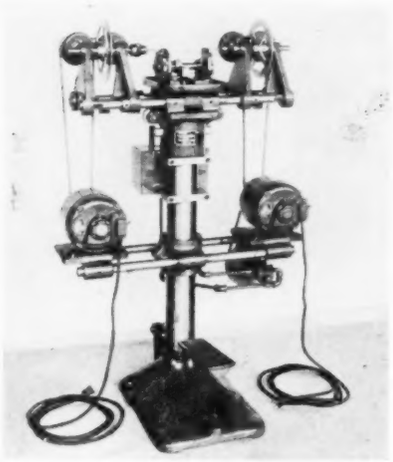


A.F.E. Wheelabrator 20 x 27-In. "Tum-Blast"

Having a capacity of 2 cu.ft., the 20x27 in. Wheelabrator "Tum-Blast" unit offered by American Foundry Equipment Co., 555 Brykit St., Mishawaka, Ind., operates in a manner similar to the larger Tum-blast models previously announced. Blast unit is mounted directly over the load and the blast is controlled so that the entire load is subjected to the blasting action. The wear-resisting rubber conveyor tumbles the work.

R-S Double-Spindle Tapping Machine

Tapping and external threading of both ends of rods, tubes and similar shapes can be performed economically with this small double-spindle machine developed by Rickert-Shafer Co., 613 W. 11th St., Erie, Pa. For external threading, the taps are replaced by solid dies or self-opening die heads. Each head is individually motor-driven and the machine can be equipped with indexing fixtures or with automatic feed arrangements to suit work to be threaded.



DeVilbiss Type DGA Air Dusting Gun

Straight line design of the Type DGA air dusting gun announced by the DeVilbiss Co., Toledo, Ohio, places the nozzle practically in line with the air hose and permits use of the nozzle in close quarters without kinking or bending the hose. Gun is operated simply by closing the hand around the gun in any reasonable position and squeezing the one-piece thumb button.

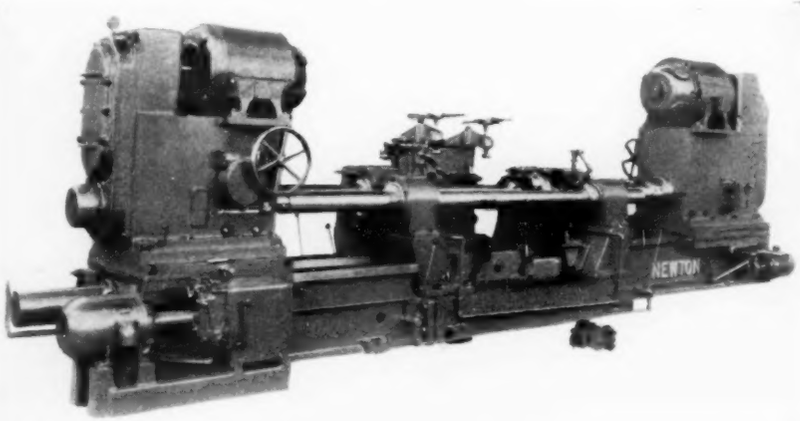
Newton Model S-87 Two-Spindle Heavy-Duty Boring Machine

Large, cast-steel electric railway motor frames are bored and faced on this Newton Model S-87 heavy-duty, two-spindle boring machine recently constructed by Consolidated Machine Tool Corp., Rochester, N. Y. Machine is of unit head construction and consists of two heads mounted on saddles which slide on wings. These wings, in turn, are fastened to opposite ends of a stationary floor-type work table.

Each spindle head is direct motor driven through suitable gears. Spindles are mounted in sleeves independently adjustable for in and out position and each head is provided with a separate feed. Boring bars are piloted through bushings in the fixture. Provision is made for accurate adjustment of tools.

The larger boring bar holds a cutting head on which are mounted sets of tools for taking rough and semi-finish cuts on the different diameter bores, for chamfering and for facing one end of the work. This bar also has provision for holding tools for facing and boring the other end of the casting. The smaller boring bar has provision for three boring tools and holds the facing tool for operations on the smaller bore.

Hydraulic feed and rapid traverse in both directions is provided for both boring bars. Control is from conveniently located levers. Cutting lubricant is brought to the tools by means of a motor-driven pump, while a second built-in pump provides lubrication to the spindle heads.



LeBlond Regals

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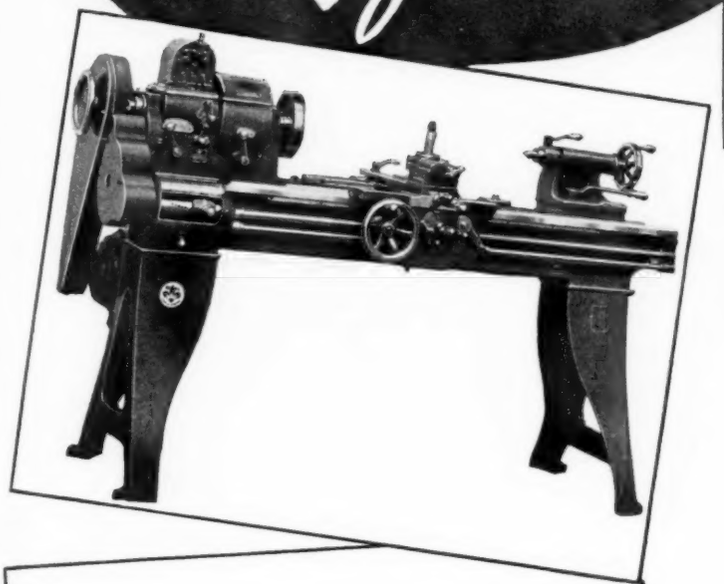
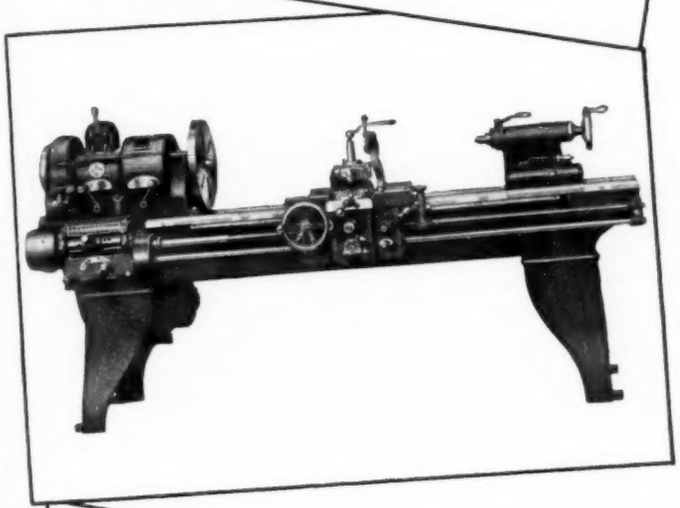
✓ price



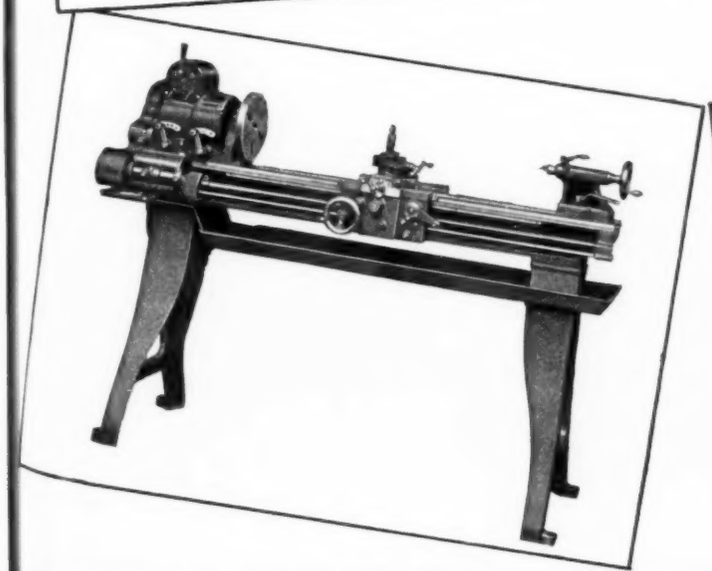


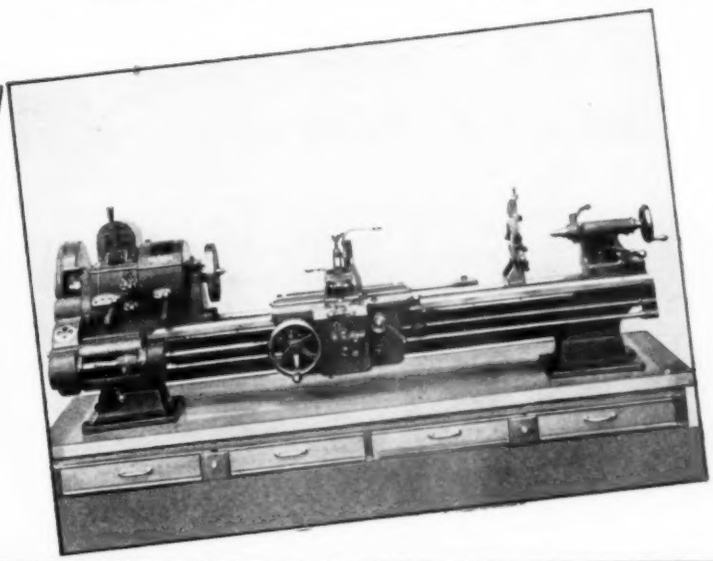
In the field of manufacture . . . there exists a popular demand for a lathe that will give precision performance on the many hundreds of turning jobs of industry . . . a lathe with all the essential qualities of design, construction and operation of the heavy duty lathes of industry—but made on a production schedule that makes low price possible. LeBlond Regals are this type of lathe. In all their basic fundamentals of dependable precision, operating ease and safety, rugged construction, modern design, Regal Lathes bear the indelible stamp of quality found in LeBlond Lathes of the heavy duty type. Only the low price gives evidence of LeBlond manufacturing skill which can make such high quality available at so low a price.

The new catalog of Regal Lathes provides complete details of the Regal Line of Lathes. Shows all features and complete specifications. Write for your copy.

The R. K. LeBlond Machine Tool Co.

Dept. H–11 ***Cincinnati, O.***



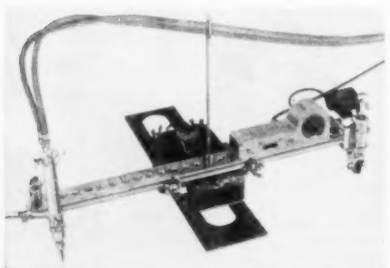


Ruthman Model 15028 Hot Lead Pump

Retaining the features and advantages of standard gusher pumps, the Model 15028 molten solder or hot lead pump announced by the Ruthman Machinery Co., is provided with twin intakes, one into the eye above and one into the eye below the impeller, and has a venturi effect passage around the impeller chamber. The small diameter impeller has special shaped blades to handle the heavy metals efficiently. Capacity, at a 2 ft. head is approximately 600 lb. per min.

CIG "Gas-O-Graph" Flame Cutting Unit

Automatic mechanical flame cutting of all types and shapes from plates and billets can be done with the automatic "Gas-O-Graph" unit announced by Compressed Industrial Gases, Inc., 221 N. LaSalle St., Chicago, Ill. Complete assembly weighs approximately 100 lb. Unlimited length of cut is attained by adding sections of track as needed and the unit is capable of cutting shapes within a range of 30 in. in width. By turning the plate, the cutting range can be increased to 54 in. in width.



Ideal "Select-O-Speed" Variable Transmission

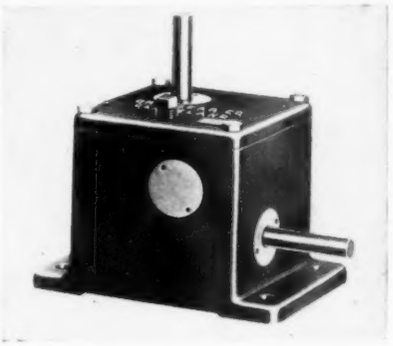
Standard V-belts are used in the "Select-O-Speed" transmission announced by Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill. An infinite selection of speeds over a 5 to 1 ratio is provided by a movement of the control lever. Sizes are available up to 7½ hp. Variation of speed ratio is made possible by two interlocking sheaves which may be pivoted laterally to change the belt tensions. Bulletin No. SST-638 discusses additional features.

Hisey Electric Tool Post Grinders

Precision ball bearings are used in the electric tool post grinders announced by The Hisey-Wolf Machine Co., Cincinnati, Ohio. These grinders are designed for attachment to the tool post of a lathe, the vise of a milling machine, or the head of a shaper and are made in ¼ and ½ hp. capacities with or without the horizontal slide adjustment shown.

Ohio Type VOO Speed Reducer

Outside dimensions of the VOO double-speed reducer, announced by the Ohio Gear Co., 1333 E. 179th St., Cleveland, Ohio, are 4½x4½x4½ in. Input and output shafts are at right angles in either the horizontal or vertical plane. Shafts are ½ in. in diameter and all gears are of S.A.E. 65 bronze. These units are available in ratios ranging from 100 to 1 up to 800 to 1, for 100 in. lb. torque capacities and in ratios of 1,600 to 1 with 25 in. lb. torque capacity.



Stow Nut Setters and Screw Drivers

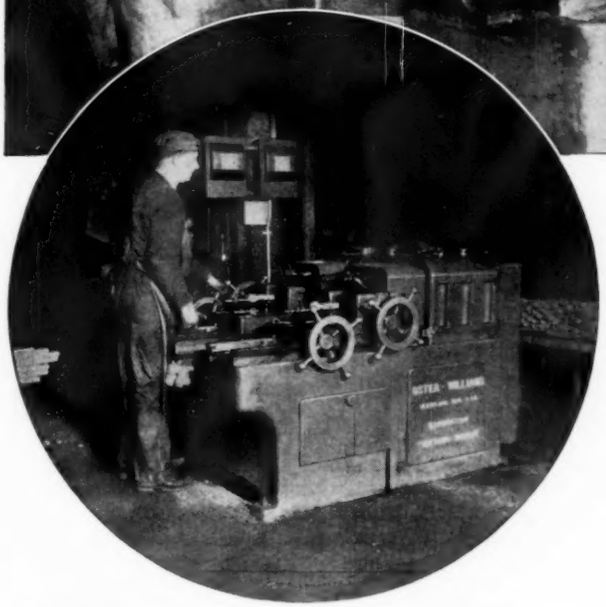
Mounted on a heavy four-caster base, the Assembly X motor-driven flexible shaft screw driving and nut setting unit announced by Stow Mfg. Co., Inc., Binghamton, N. Y., is available in capacities ranging from ¼ to 1 hp. with shaft speeds ranging from 600 to 350 r.p.m. The screw driver handpiece operates with a positive clutch which is in engagement only when the screw driver blade is in contact with the screw. The ceiling mounted unit shown is listed as Assembly Y and uses the same drive motor and hand piece.

H. & G. Style SAM Adjustable Die Head

Threading and tapping operations can be performed at the same time, even though the pitches are different, with the H. & G. Style SAM solid adjustable die head which has been

MAKING GOOD WHEREVER INSTALLED

Salvaging rusted bolts in large midwestern railway shop



● NEWEST machine in its class, the Rapiduction has already forced its way to the front. Fast, accurate and easy to set up for standard or special jobs, it will handle bolts, staybolts, anchor bolts, tie rods, jackscrews, vise screws, steering rod knuckles, heavy cap screws, hooks and eyes, pipe, nipples or what have you. Capacity, ½" to 2¼", or ⅜" to 1½", in both single spindle and double spindle types. Spindle speeds, 32 to 298 R. P. M.

● The first purchasers of Rapiduction Bolt Threaders bought on recognition of sound engineering and faith in the OSTER-WILLIAMS reputation. Today the orders are based on demonstrated superiority of performance. Before buying any production bolt threader get the RAPIDUCTION facts. Write

THE OSTER MANUFACTURING COMPANY

Sales Office: 2049 East 61st Street, Cleveland, Ohio

Factories: Erie, Penna., and Cleveland, Ohio

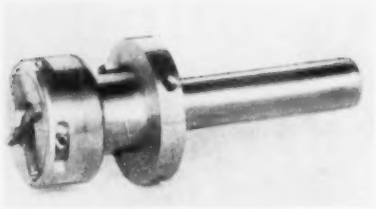
New York City Office: 30 Church St.

Philadelphia Showroom and Office: 111 North 3rd Street

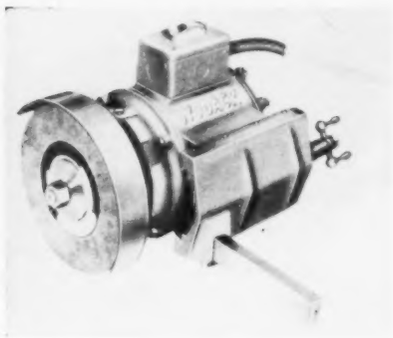
THREADING HEADQUARTERS SINCE 1893

OSTER THREADING EQUIPMENT WILLIAMS

RAPIDUCTION BOLT THREADER



combined with a compensating tap holder by the Eastern Machine Screw Corp., 20 Barclay St., New Haven, Conn. This tool holder provides the proper starting pressure for starting the external thread, after which the died head floats on its own lead independent of the tap. By properly locating the tap lengthwise in the holder, both threads can be finished and reversed simultaneously.

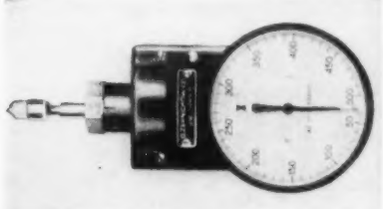


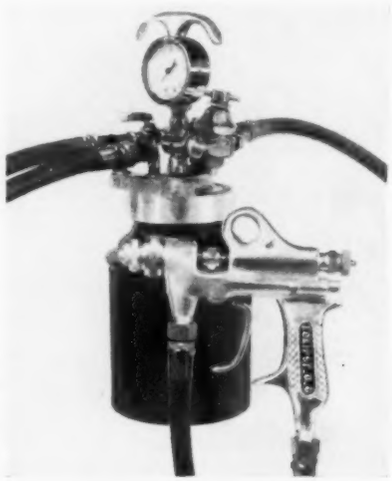
Wodack Tool-Post Grinding Heads

Tool post grinders, available with or without horizontal feed arrangement shown, have been developed by Wodack Electric Tool Corp., 4627–29 W. Huron St., Chicago, Ill., for use on lathes, shapers, planers and milling machines. Ball bearings in dust proof housings are used in all models. An air cleaner having a removable filter pad keeps dust from entering the motor. These grinders are equipped with a tooth rest, an 8 x $\frac{3}{4}$-in. wheel, wheel guard and mandrel for internal grinding.

O-Z Universal Type 50 Tachometer

Peripheral speeds ranging from 12 to 15,000 ft. per min. and rotary speeds of 40 to 50,000 r.p.m. can be measured with the improved Type 50 universal hand tachometer announced by O. Zernickow Co., 15 Park Row, New York, N. Y. This instrument has a 2$\frac{7}{8}$-in. diameter dial and indicating mechanism is mounted in a metal housing. Fixed reading device is controlled by push-button.



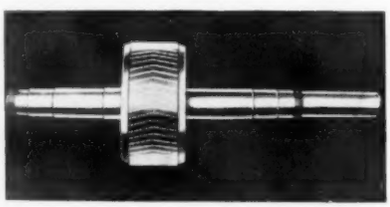


Eclipse Model B+ Pressure Feed Unit

Available in one and two-quart sizes for use with any Eclipse paint spray gun, the Model B+ pressure feed spray unit announced by the Eclipse Air Brush Co. Inc., 390 Park Ave., Newark, N. J., includes a pressure regulator, air gage, shut-off valve on the air supply line, a three-way release valve and a safety valve mounted on a light-weight control head. With the B+ unit, the gun will spray with full efficiency in any position, including the vertical pointing directly up or down. Paints and enamels can be applied at pressures as low as 10 lb.

Sterling "Klosd" Electric Motors

"Klosd" induction-type electric motors now are provided with a herring bone-type rotor which is claimed to provide smooth operation and eliminate end thrusts. Offered by Sterling Electric Motors, Inc., Telegraph Road at Atlantic Blvd., Los Angeles, Calif., these motors have "Mica-Bestos" process insulation which is incombustible, non-carbonizing and moisture-resisting.



"Handee" Drill Press

Capable of drilling holes up to $\frac{1}{8}$ in. in diameter, the "Handee" precision drill press stand announced by Chicago Wheel & Mfg. Co., 1101–1103 West Monroe St., Chicago, Ill., is powered by a "DeLuxe Handee" grinder which gives a spindle speed

of 25,000 r.p.m. Feed of the work table to the drill is controlled through a rack and pinion. Power unit may be detached and used for grinding, drilling and polishing operations.

M.S.A. Coated Cover Glass

Immunity to piting and resistance to heat are among the features claimed for coated cover glass announced by the Mine Safety Appliances Co., Braddock, Thomas and Meade Streets, Pittsburgh, Pa. Used for welding and cutting operations, this coated cover glass is claimed to provide positive protection against molten sparks fusing to its surface. It insulates the shaded welding lenses against heat, and protects the welding lenses from breakage. This glass is available in standard 2 x 4$\frac{1}{4}$ in. plate and 50 mm. round lenses. Also, it may be cut to the size required for grinding wheel guards, automatic welding machines or special helmets and goggles.

Illinois Shock-Proof Portable Pyrometer

Movement of the improved Type 3091 shock-proof portable pyrometer announced by Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago, Ill., is spring suspended

REDUCTORS* is the registered trade name for Boston Gear Speed Reducers, and there are more than 5000 of them in stock ready for your use. This stock comprises 278 different ratios, types and sizes. On a moment's notice you can get a Reductor in almost any ratio between 3 to 1 and 4000 to 1. Forty pages of our New General Catalog No. 52 are devoted to specifications and list prices of these Reductors. You will also find in this catalog simple engineering formulas which will help you with your own selection. Boston Gear Reductors are carried in stock by the following authorized distributors who will be glad to give you a copy of our General Catalog No. 52 and serve you whenever the occasion arises:

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The Western Iron Stores Co.

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R. C. Duncan Company

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Renold Coventry, Ltd.

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Couch & Heyle, Inc.

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W. M. Steele Company

YORK, PENNSYLVANIA
Geo. F. Motters Sons Supply Co.

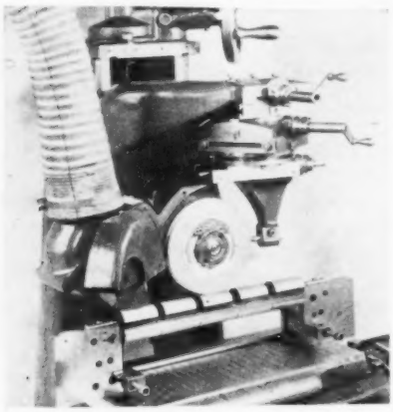
* Reductors Reg. U. S. Patent Office

BOSTON GEAR WORKS, INC. NORTH QUINCY, MASS.

within the case. An improved pointer lock damps the movement of the instrument when carried or transported. Shatter-proof glass is used and the heavy metal case is designed to prevent breakage if the instrument drops.

U. S. Compound Truing Attachment

Designed for mounting permanently on the spindle column of a surface grinder, this compound wheel-truing attachment announced by U. S. Tool Co., Inc., Ampere, N. J., is said to be



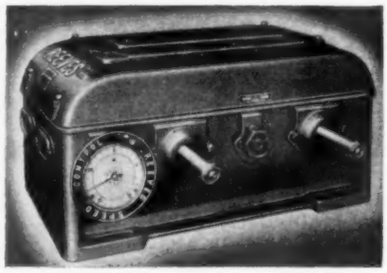
suitable for any form wheel. Any desired angular or radial form can be dressed and combinations of radial and angular forms are blended to give a continuous surface. The three adjustable slides on the unit are furnished with scales.

Burke Pivot-Mounted Electric Motors

All types of electric motors and generators offered by Burke Electric Co., Erie, Pa., can be furnished with a welded-steel pivot-type mounting which has been designed especially for short-center V and at belt drives. Use of this pivoted arrangement permits the motor automatically to keep the belt tension in proportion to the load and to take care of normal belt elongation.

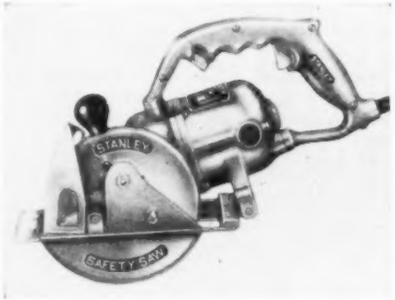
Reeves "Speedial" Control Handwheel

An improved speed indicator for use with variable speed control equipment has been announced by Reeves Pulley Co., Columbus, Ind. This "Speedial" handwheel is used in place of the regular speed control hand-wheel and dial-type indicator for all sizes of variable speed transmission and varispeed motor pulleys, as well as the "Motodrive" unit.



Stanley Type W-60 Portable Saw

Light-weight, heavy-duty Type W-60 portable safety saw, offered by Stanley Electric Tool Div., The Stanley Works, New Britain, Conn., has a 6-in. diameter blade and cuts to a depth of $1\frac{7}{8}$ in. Only one adjustment is necessary to regulate the depth of cut. No load blade speed is 3,200 r.p.m.; net weight is 15 lb. Bulletin No. 37A gives complete specifications.



Benjamin "Alzo-Lite" Floodlighting Unit

Designed for use with 750, 1,000 or 1,500 watt lamps, the "Alzo-Lite" medium-spread type floodlighting unit announced by the Benjamin Electric Mfg. Co., Des Plaines, Ill., is weatherproof and is recommended for outdoor locations. Various styles of mounting brackets are available.

"S. C." Spring-Mounted Roller Conveyor

An impact-absorbing roller conveyor, designed to remove loading shocks from roller bearings and shafts, has been announced by the Standard Conveyor Co., North St. Paul, Minn.

Each roller assembly is mounted in a set of steel arms which pivot on a shaft extending through the arms and frame. Coil springs, one for each arm, are attached so as to distribute the load over adjacent rollers.

Parker Improved Parkerizing Process

An improved parkerizing process announced by the Parker Rust-Proof Co., 2177 E. Milwaukee Ave., Detroit, Mich., is said to reduce the

processing time to approximately 30 min., about one-third to one-half of that formerly required. The new solution reacts at 180 F. instead of 210 F., resulting in a lower heating cost.

Less sludge is said to be formed in the processing tank with the improved chemicals and a finer grained, smoother coating is produced. This process is suitable for stampings, castings, forgings or screw machine products where a jet black finish is desirable and a high degree of rust resistance is essential.

Durez No. 278 Impregnating Resin

Developed for increasing the density of certain types of castings, "Durez" No. 278 impregnating resin offered by General Plastics, Inc., Walck Road, North Tonawanda, N. Y., is claimed to overcome slight porosity of castings. Proper impregnation is made by pressure, or vacuum and pressure, after which the casting is baked at 250 F. or higher to set the resin. When hardened in this way, the resin is said to be practically unaffected by water, solvents, mild alkalies and acids.

"Fleetweld No. 9 HT" Welding Electrodes

Developed for welding high tensile steels of 70,000–80,000 lb. per sq.in. tensile strength in pressure vessel construction, the "Fleetweld No. 9 HT" welding electrode announced by Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio, produces weld metal which is said to have extra strength and creep resistance at elevated temperatures. The electrode operates well with a.c. or d.c. supply. It is suitable for welding in a down, or flat, position only.

G. E. Glyptal No. 1294

Developed for the prevention of the adhesion of weld spatter to metals which are to be welded, Glyptal No 1294 offered by General Electric Co., Schenectady, N. Y., can be used without harm on any metal surface, including polished stainless steel. It is said not to produce carbon to make the weld hard or brittle, nor will it reduce ductility. Likewise, it will not give off smoke and will not form gas pockets or cause the weld to be porous. In applying this preparation, spraying is preferred to brushing as the former method assures a thinner and more uniform coat.

Canton No. 1 Alligator Shear

Canton Foundry & Machine Co., Div. The Hill Clutch Machine & Foundry Co., 6400 Breakwater Ave., Cleveland, Ohio, offer the No. 1 busheling alligator-type shear, which is equipped with 24-in. knives and has a 12-in. jaw opening. V-belt drive is from a 3 hp. motor. The complete machine, weighing 6200 lb., occupies a 8x3½ ft. space when mounted on timbers. Approximately 50 cuts per min. can be made. Bars 1½ in. square can be sheared.

U. S. "Peerless" Lined Solvent Hose

Lacquers, synthetic enamels and solvents are said not to affect the "Peerless" P-243 synthetic lined hose announced by United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. Since the tube is of syn-

GORTONS and
HOOVER
CLEANING ENSEMBLES
The bag ring necessarily gets a lot of handling from users of Hoover Cleaning Ensembles. Each time the bag is emptied the ring has to be removed and then replaced dust-tight. The Hoover Company makes the bag ring of a plastic material, the molds for which are produced on the Gorton Duplicator at large savings over former methods.
The 9 cavity mold originally used required 56 hours of tool labor per cavity, a total of 504 hours. With a Gorton Duplicator, after the first cavity was tooled out, it was used as a master for reproducing the other 8 cavities in 8 hours each. The tool labor for the mold was thus reduced to 120 hours, a saving of 384 hours or 76%.
Ask us to show you what we have done in reducing die and mold production costs.
GEORGE GORTON MACHINE CO.
1103 13TH ST., RACINE, WIS.

thetic stock, it is said that practically no swelling develops when it is used as a solvent hose, even at temperatures up to 150 F. It is available in $\frac{1}{4}$ to $\frac{3}{4}$ in. diameters.

B.-C. "Pinwedge" Expansible Reamers

"Pinwedge" adjustable, expansible reamers, offered by Barber-Colman Co., River and Loomis Sts., Rockford, Ill., are available in chucking and shell types with diameters ranging from $\frac{13}{16}$ to 3 in. Previously described as the "Masterall" reamer (*A.M.*—Vol. 82, page 300) the name has been changed recently.

C.-H. Improved Magnetic Control

A line of d.c. heavy-duty controllers for machine tool applications, for heavy-duty applications below 10 hp. and for general purpose use above 10 hp. has been announced by Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis. A new timing device which operates magnetically is claimed to provide positive, precise definite time acceleration which is unaffected by load, temperature or other working conditions.

DuPont Chrome Refinishing Kit

E. I. du Pont de Nemours and Co., Inc., Wilmington, Del., is marketing a chrome refinishing kit for removing rust from chrome-plated metals and protecting the chrome so that it stays bright. The kit contains a tube of a specially formulated paste cleaner, a can of protective lacquer and a brush for applying the lacquer. This lacquer is a clear, methacrylate product which dries in 15 min., forming an invisible film over the surface.

Faber "Hot-Rite" Marking Crayons

Hot steel and other metals can be marked with the "Hot-Rite" crayons announced by Eberhard Faber Pencil Co., 37 Greenpoint Ave., Brooklyn, N. Y. Yellow and white marks are said to withstand as much as 1,500 F. These crayons also can be used to mark cellophane, celluloid, glass, leather, porcelain, rubber and wood. Five distinct colors are available.

Sterling Sander Valve Control

The Sterling Products Co., 2457 Woodward Ave., Detroit, Mich., has developed an automatic valve control which automatically starts and stops the "Speed-Bloc" sander and controls the flow of water when hose is attached for wet sanding. Unit is arranged to turn the air and water on when the operator grasps the head of the sanding unit and to return to the off position when the operator removes his hand.

Markal Paint Stick

Markal H solidified paint sticks, developed by Markal Co., 6 E. Lake St., Chicago, Ill., can be used for marking hot surfaces from 200 to 1500 F. with maximum legibility. Six colors are available, permitting color as well as symbol identification. A companion product, Markal C is available for marking cold surfaces.

Courtesy of The Rathbun-Jones Engineering Co.

• compensates for wear

These Diesel engines have used Laminum shims the past six years, for adjusting main and connecting rod bearings and journal caps. (Babbitt-tipped shims are specified, to maintain close oil and pressure seal.) "Adjustments should be made after about .003-inch wear," RATHBUN-JONES recommend, emphasizing the continuous precision-adjustment feature afforded by Laminum shims during machine life. They praise, too, the ease of handling. Write for Laminum sample.

LAMINATED SHIM CO., INC. 21-14 44th Ave., Long Island City, N. Y.
Cleveland Dallas Detroit Houston Milwaukee Tulsa
1079

LAMINUM
Precision adjustment **SHIMS**

"Kennametal" Synthetic Hard Metal Carbide

A compound of tungsten, titanium and carbon offered as "Kennametal" by McKenna Metals Co., P. O. Box No. 85, Latrobe, Pa., is used as an ingredient in the manufacture of hard carbide alloys for steel-cutting tools. Tool blanks of compositions of "Kennametal" are brazed to steel shanks with copper or bronze.

Universal Type Renewable Disk

An all-purpose universal globe valve disk announced by the Goetze Gasket & Packing Co., Inc., New Brunswick, N. J., is recommended for handling air, gas, steam and liquids at any temperature or pressures. This disk is of laminated construction, built up of alternate layers of asbestos and metal encased in a two-piece shell of copper, Monel or other alloy metal. Disks are made in sizes for $\frac{1}{4}$ to 12 in. valves with round or oblong holes.

N. Y. "Magic" Solvent Hose

New York Belting & Packing Co., 1 Market St., Passaic, N. J. has developed the "Magic" lacquer spray and solvent hose for use with lacquer and synthetic enamels containing butyl acetate. Listed as Hose No. NY-1616, this synthetic-lined hose is available in $\frac{1}{4}$ to $\frac{3}{4}$ in. diameters.

Johansson Gage Block Reconditioning Service

Reconditioning operations have been extended to gage blocks of 2, 3 and 4-in. sizes by the Johansson Div., Ford Motor Co., 3674 Schaefer Road, Dearborn, Mich. Previously, reconditioning service has been available only for blocks of the 5-in. size or larger. Blocks that have become worn beyond their original accuracy can be renewed in most cases to within their original accuracy.

Lincoln "Spatter Film"

"Spatter Film" compound, offered by the Lincoln Electric Co., Cleveland, Ohio, is claimed to reduce cleaning time after welding by reducing the tendency of spatter to adhere tightly, thus facilitating its removal. This compound is soluable in water and is non-inflammable. It is easy to apply by means of an ordinary paint brush and only enough of the film to cover the work adjacent to the seam or joint is needed.

Carron "Engrav-Rite" Electric Marking Tool

Permanent marks on steel, brass, bakelite, alloys, glass and other materials can be made with the "Engrav-Rite" electric marking tool, offered by Carron Mfg. Co., 415 S. Aberdeen St., Chicago, Ill. These units are built to operate on 110 volt, 60-cycle a.c. circuits, but can be furnished for 220 volt, 25, 50 and 60-cycle circuits. For marking glass and hard metals a special "Carrorite" point is furnished. When plugged into an a.c. outlet, the machine sets up a vibration which causes the point to vibrate up and down, giving a chisel-like effect. By moving the hand slightly, engraving can be done and other marks of identification can be placed on tools and other parts.

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DAYTON, OHIO 990 E. MONUMENT AVENUE
PHILADELPHIA, PA. 3913 N. BROAD STREET
ROCHESTER, N. Y. 16 COMMERCIAL STREET
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● Those firms that use stampings to the point that they are major items in cost, long ago learned the value of the Danly Precision Die Set.

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DANLY MACHINE SPECIALTIES, Inc., 2110 So. 52nd Ave., Chicago, Ill.

DANLY DIE MAKERS' SUPPLIES

TRADE PUBLICATIONS

ACID RESISTANT Bulletin N-1, offered by Haveg Corp., Newark, Del., describes the features of Haveg cold-setting acid resistant cement and discusses proper methods for using this material.

BELLOWS Bulletin No. SS-1, offered by Chicago Metal Hose Corp., Maywood, Ill., discusses the features of C.M.H. stainless steel bellows. These units are available in a number of sizes and standard forms.

BUILDING PROTECTION A 12-page bulletin offered by Truscon Laboratories, Caniff and G.T.R.R., Detroit, Mich., discusses the restoration and preservation of brick and concrete with "StoneTex".

BELTING DATA A 32-page belting data book which includes recommendation tables and other data on transmission, conveyor and elevator belts, has been issued by New York Belting & Packing Co., 1 Market St., Passaic, N. J. Illustrations show proper methods of applying various belts.

CLEANING Two new models of the "Hypressure Jenny" steam vapor spray cleaners are described in bulletins offered by Homestead Valve Mfg. Co., Coraopolis, Pa.

COUNTER The "Timeter" electrically operated counter, which automatically registers the total number of hours that any electrical device or motor driven machine is in operation, is described in Bulletin No. 386 offered by National Instrument Co., 44 School St., Boston, Mass.

DIESEL ENGINES Bulletin No. 769, published by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y., discusses the features of Type RHB-100 heavy-duty continuous service diesel engines, which are available in sizes ranging from 300 to 800 hp.

ELECTRIC FANS "The Inside Story of Emerson-Electric Fans" is the title of Bulletin No. X2472 offered by The Emerson Electric Mfg. Co., St. Louis, Mo. to those who request it on their company stationery. Catalog No. X2458 describes a complete line of air circulators.

ELECTRIC HEATERS Bulletin No. 38-A, published by the Electric Air Heater Co., Div. American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind., describes the construction, operation and application of "Electromode" electric unit heaters for industrial use.

ELECTRODE Characteristics of the Type W-3 thinly coated electrode for high-speed arc welding are given in Bulletin No. GEA-2965 recently announced by General Electric Co., Schenectady, N. Y.

FURNITURE A comprehensive line of industrial stools and chairs is described in a catalog and reference book offered by Royal Metal Mfg. Co., 1138 S. Michigan Ave., Chicago, Ill.

GAS MASKS Bulletin No. ED-3, offered by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa., discusses the features of standard industrial gas masks and canisters, a number of which have been officially approved by the U. S. Bureau of Mines.

HEAT EXCHANGERS Bulletin No. 1601-A offered by the Duriron Co.,

HOW DO YOU BUY STEEL?

Purchasing management formerly placed orders for steel on a price and shipment basis on the assumption of standard quality. However, with automatic processes and higher speeds, greater strains, etc., much closer uniformity is not only desirable, but often absolutely essential in securing faster factory schedules and lower production costs.

Anticipating this situation, Ryerson turned all old stocks, tightened specifications, and made inspections more rigid.

Only whole heats of alloy steel in narrow range analyses are selected for stock. Bars from every heat are analyzed and actually heat treated. Data sheets showing exact analysis and heat treatment results are sent with every order as a guide to securing the best heat treatment results. In addition, Ryerson certifies to the uniform high quality of every steel product.

Never before has any such quality control been attempted by a steel service organization. But the results are well worth the effort. Manufacturers are reporting savings in time, reduction in spoilage and lower costs. The safety factor is also an important consideration.

Since this higher uniform quality can be purchased without increase in price, we believe it will pay you to concentrate with Ryerson. Remember the steel is in stock and shipment is immediate.

If you do not already have a copy, we will be pleased to send you our illustrated book completely describing the Ryerson Certified Steel Plan.

RYERSON *Certified* STEELS

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Inc., Dayton, Ohio, discusses the construction and use of two different size heat exchangers for corrosive liquids, such as pickling and plating solutions.

JACKHAMER Bulletin No. 2433, offered by Ingersoll-Rand, 11 Broadway, New York, N. Y., describes the JA-35 light-weight jackhamer which recently was placed on the market. This tool weighs less than 35 lb.

LIFTING MAGNETS Catalog No. 22, a 16-page bulletin announced by Dings Magnetic Separator Co., Milwaukee, Wis., discusses the features of high-intensity lifting magnets; it also illustrates various types of magnetic separators.

LIGHTING "Vaportight" industrial lighting fixtures, fitted for use where dirt, dust, gases, moisture or other severe conditions are found, are described in Bulletin No. 1125, offered by the Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill.

LIGHTING Bulletin No. 7, offered by United Cinephone Corp., 43-37 33rd St., Long Island City, N. Y., discusses the features of "Orthoplane" lighting and shows two standard lighting units.

MARKET RESEARCH The 1938 edition of "Market Research Sources" has been compiled by the Marketing Research Division, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C. This edition brings up to date the record of marketing research in the United States and can be made to serve as a source book and as a check-up on work which has been done or is being currently conducted. Identified as Domestic Commerce Series No. 55, copies of the publication may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C. Price, 30 cents.

MICROMETER Readings to 0.00001 in. can be duplicated with the improved light wave micrometer offered by The Van Kuren Co., 12 Copeland St., Watertown, Boston, Mass., and described in Circular No. M-30.

MONEL PARTS A booklet entitled "The Third Essential" published by the International Nickel Co., Inc., 67 Wall St., New York, N. Y., outlines the use of monel parts in steam specialty equipment.

MOLDINGS Dahlstrom Metallic Door Co., Jamestown, N. Y., has announced publication of a 1938 catalog showing a large number of examples of metal moldings and shapes for a variety of uses. These shapes are rolled or pressed in 10 to 16 lengths.

PUMPS The Cameron Class TRV turbine-driven pump recently announced by Ingersoll-Rand Co., 11 Broadway, New York, N. Y., is described in Bulletin No. 2390 now being distributed.

REGULATORS Catalog Section No. 31-260 offered by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., describes "Silverstat" automatic voltage control regulators for a.c. and d.c. generators. Illustrations include schematic wiring diagrams and outline dimensions.

SHAPER Catalog No. 30, announced by the Atlas Press Co., Kalamazoo, Mich., discusses the features of the 7-in. stroke Atlas shaper. Specifications are tabulated.

SAFETY "Stop Foot Injuries" is the title of a 32-page hand book of

DO-ALL
BAND SAWING, FILING, POLISHING MACHINE

Spectacular Performance

● Model ML—newest Do-All Machine—does faster, smoother, more accurate work—both internal and external—on 48 different substances (up to 10" thick) from hardest high carbon steel to soft brass, copper, etc.

Only machine in the world with this wide speed range—50 to 1500 feet per minute. Does jobs in one hour which formerly required a whole day.

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Work table 24" square, tilts four ways. Throat 16" deep. Weighs 1300 pounds. Requires 33 x 25" floor space.

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facts for the safety engineer published by Lehigh Safety Shoe Co., Inc., Allentown, Pa. Informative data on general industrial safety are given.

STAINLESS STEEL The Stainless Steel Div., Smith Steel Foundry Co., 1320 S. First St., Milwaukee, Wis., has published the first two of a series of small pamphlets, the first listing in convenient form the resistance of 18-8 stainless steel alloy to various media and the second pamphlet giving condensed information on stainless steel castings.

STEEL MOLDING Color stripe stainless steel molding with a snap-on mounting feature is described in a circular being distributed by Pyramid Metals Co., 455 North Oakley Blvd., Chicago, Ill.

SAND CONDITIONING Two catalogs discussing methods of sand conditioning have been published by American Foundry Equipment Co., 555 Brykit St., Mishawaka, Ind. Catalog No. 20 describes the Model M sand cutter, while catalog No. 15 discusses the features of the Model AA sand cutter.

RIVETING Catalog No. 227, offered by Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill., discusses the features of a number of standard and special squeeze riveters for rivets ranging from $\frac{1}{8}$ to 2 in. in diameter.

TAP EXTRACTORS Extractors for backing out broken taps are described in a mailing folder, Form No. 132, now being distributed by the Walton Co., 96 Allyn St., Hartford, Conn.

THREADING PROFITS "Here's One Way for Your Plant to Make a Profit Now" is the title of a mailing piece being distributed by Landis Machine Co., Inc., Waynesboro, Pa. The Landis "Survey Plan" is outlined.

TUBING Joseph T. Ryerson & Son, Inc., 16th and Rockwell St., Chicago, Ill., is distributing a 24-page illustrated booklet in which are described varied industrial applications of Timken seamless tubing. Included are physical property specifications, tolerance charts and other data of importance to the user of seamless mechanical tubing.

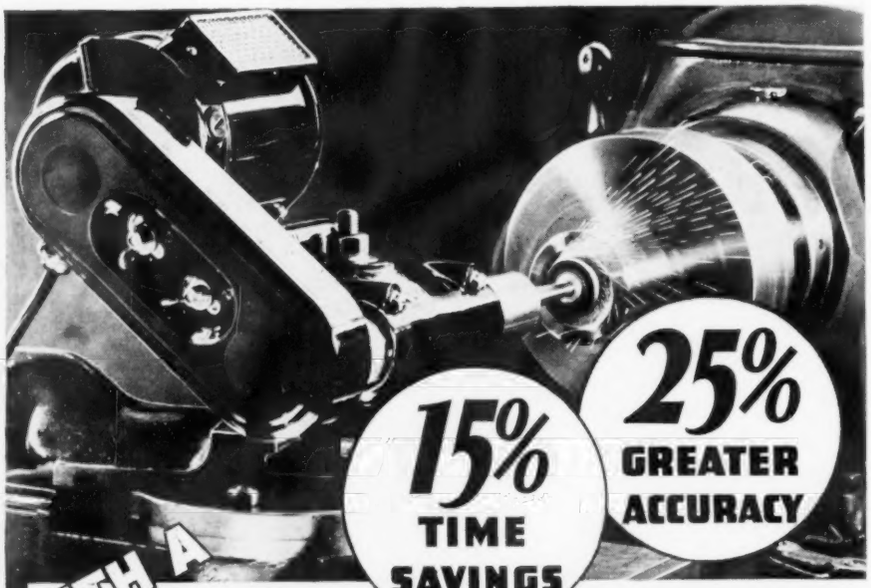
VACUUM CLEANING Bulletin No. 63 offered by Connecticut Blower Co., P.O. Box 884, Hartford, Conn., discusses the features of several industrial vacuum cleaning systems.

VALVES Reference Book No. 38, offered by Homestead Valves Mfg. Co., Coraopolis, Pa., gives data on a full line of valves and other Homestead products.

WIRING Use of "Trol-E-Duct" to provide a flexible wiring system with movable outlets is discussed in a 12-page booklet offered by Bull Dog Electric Products Co., 7610 Jos. Campau Ave., Detroit, Mich.

WELDER CONTROLS Bulletin No. GEA-2791A, offered by General Electric Co., Schenectady, N. Y., describes "Thyratron" resistance-welder controls for accurate spot and projection welding.

WELDING ELECTRODES Bulletin No. R-5, published by the Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., gives complete information on each of a number of "Smootharc" welding electrodes. A number of the pages are given over to data of value to the designer and welding operator.



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Good times or bad, there is always a place for tools that accomplish new savings in time and lower labor costs. Dumore *precision* Grinders go further than that. They increase accuracy and help you put out better finished products—quality that helps you keep the wheels turning even when times are tough. That's why there's little lag in Dumore sales during dull periods.

In the modern tool room or on the production line . . . wherever high speed grinding and finishing are required to tolerances as close as a tenth (.0001") . . "nothing does the trick quite like a Dumore", say owners of Dumore grinders. Ask any of the distributors in the list below to show you how Dumore makes savings. He will gladly give you a demonstration without obligation. Or write the factory for facts.

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BOSTON — Chandler & Farquhar
Chase, Parker & Co., Inc.
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BRIDGEPORT, CONN.—Hunter & Havens
BUFFALO—Beals, McCarthy & Rogers, Inc.
CANTON—Canton Hdwe. Co.
CHARLESTON, S. C.—Cameron & Barkley Company
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Samuel Harris & Co.
CINCINNATI—E. A. Kinsey Co.
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COLUMBUS—Osborne & Sexton
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W. H. Kiefaber Co.
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DETROIT—Boyer-Campbell Co.
Chas. A. Strelinger Co.
ERIE, PA.—H. P. Weller Sup. Co.
FT. WAYNE—Nat'l Mill Sup. Co.
GRAND RAPIDS—Mtrs. Sup. Co.
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O. H. Van Horn Co., Inc.
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LOS ANGELES—Ducommun Metals & Supply Co.
Eccles & Davies Machy. Co.
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MILWAUKEE—W. A. Voell Machy. Co.
Western Iron Stores Co.
MINNEAPOLIS—Duncan & Co.
MOLINE, ILL.—I. J. Normoyle Co.
MONTREAL—Canadian Fairbanks-Morse, Ltd.
Williams & Wilson, Ltd.
MUSKEGON, MICH.—Muskegon Hdwe. Co.
NASHVILLE—Buford Bros., Inc.
NEWARK—Abrasive Machine & Supply Co.
NEW HAVEN—C. S. Mersick
Page, Steele & Flagg
NEW ORLEANS—Oliver H. Vanfloro Co., Inc.
NEW YORK—Morris Abrams Guarantee Specialty Co.
Hansen & Yorke Co., Inc.
OKLA. CITY—Mideke Sup. Co.
ORLANDO, FLA.—Harry P. Lee, Inc.
PEORIA—Couch & Heyle, Inc.
PHILADELPHIA—Maddock & Co
W. B. Rapp, Machinery
PITTSBURGH—Standard Machinist's Supply Co.
PORTLAND, ORE.—J. E. Haseltine & Co.
PROVIDENCE—Belcher & Loomis Hardware Co.
Reynolds Machinery
READING, PA.—Reading Machine & Tool Co.
RICHMOND—Smith-Courtney
ROCHESTER, N. Y.—Erskine-Healy
ROCKFORD, ILL.—Mod-States Industrial Corp.
SAGINAW, MICH.—Reichle Supply Co.
ST. LOUIS—Colcord Wright Machinery & Supply Co.
SALT LAKE CITY—Salt Lake Hardware Co.
SAN FRANCISCO—Harron, Rickard & McCone Co.
C. W. Marwedel
SEATTLE—Cragin & Co.
Seattle Hardware Co.
SHREVEPORT—Van Horn & Co.
SOUTH BEND—So. Bend Sup. Co.
SPRINGFIELD, MASS.—Carlisle Hardware Co.
SYRACUSE—Syracuse Supply Co.
TAMPA—Cameron & Barkley Co.
TOLEDO—Cornell Supply Co.
Kirby Mach. & Supply Co.
National Supply Co.
TORONTO—
Canadian Fairbanks Morse
TROY, N. Y.—Fred K. Blanchard
TULSA—Mach. Tool & Sup. Co.
VANCOUVER, B. C.—Crossman Machinery Co., Ltd.
WORCESTER, MASS.—Waite Hdwe. Co.
YORK, PA.—York Machy. & Supply Co

PATENTS

May 31, 1938

Metal-Working Machinery

Grinding Machine. Attilio R. Spicacci, Bristol, Conn., assigned to General Motors Corp., Detroit, Mich. Patent 2,118,902.

Cutter Grinder. Joseph B. Armitage, Wauwatosa, Wis., assigned to Kearney & Trecker Corp., West Allis, Wis. Patent 2,118,912.

Cutter Grinder. Frank W. Curtis, Wauwatosa, Wis., assigned to Kearney & Trecker Corp., West Allis, Wis. Patent 2,118,967.

Thread Cutting Machine For Finish Rings. Howard J. Thomas, Jackson, Miss., assigned to Knox Glass Bottle Co., Jackson, Miss. Patent 2,118,989.

Spring Coiling Machine. Charles R. Bergevin, Worcester, Mass., and Arthur C. Nigro, Torrington, Conn., assigned to The Torrington Mfg. Co., Torrington, Conn. Patent 2,119,002.

Grinding Machine. Charles H. Richards, Worcester, Mass., assigned to The Heald Machine Co., Worcester, Mass. Patent 2,119,290.

Machine for Generating Gears. Heinrich Schicht, Huckeswagen, Germany, assigned to W. Ferd. Klingelnberg Söhne, Remscheid-Berghausen, Germany. Patent 2,119,295.

Grinding Machine. William D. Schmidt, Worcester, Mass., assigned to The Heald Machine Co., Worcester, Mass. Patent 2,119,296.

Parts and Mechanisms

Lathe Chuck. Percy L. Bowser, University City, Mo., assigned to The Sterling Corp., St. Louis, Mo. Patent 2,119,004.

Automatic Stop For A Threading Die Head. Harry T. Kimlin and Douglas O. Kimlin, Hyde Park, N. Y. Patent 2,119,014.

Tool Holder. Werner Irving Senger, Madison, Wis., assigned to Gisholt Machine Co., Madison, Wis. Patent 2,119,029.

Belt Tightener Base. Wayne J. Morrill, Fort Wayne, Ind., assigned to General Electric Co., Schenectady, N. Y. Patent 2,119,397.

Processes

Method of Making a Spray Gun. John T. Peterson, Chicago, Ill. Patent 2,119,056.

Method for Producing Flat Blanks for Aluminum Cooking Vessels. Albert Friedrich Strack, Suresnes, France. Patent 2,119,088.

Electroplating. Eugene D. Viers and Bernard C. Case, Cleveland, Ohio, assigned to Eaton Detroit Metal Co., Cleveland, Ohio. Patent 2,119,304.

Tools and Accessories

Thread Forming Chaser Supporting and Adjusting Means. John S. Bartek, Rochester, N. Y., assigned to Consolidated Machine Tool Corporation, Rochester, N. Y. Patent 2,119,036.

Tool Holder. Pompeo Rocchi, Jamaica, N. Y. Patent 2,119,217.

Grinding Wheel. William A. Kerr and Robert A. Grubbs, Douds, Iowa. Patent 2,119,279.

Gear Finishing Tool. Alex W. Simowski, Detroit, Mich., assigned to Michigan Tool Co., Detroit, Mich. Patent 2,119,298.

Segmental Abrasive Wheel and Method of Making the Same. Albert L. Ball, Lewiston Heights, and Raymond C. Benner, Niagara Falls, N. Y., assigned to The Carborundum Co., Niagara Falls, N. Y. Patent 2,119,412.

June 7, 1938

Metal-Working Machinery

Helical Spring Machine. Carl H. Peterson, Worcester, Mass., assigned to The American Steel & Wire Co. of New Jersey. Patent 2,119,513.

Machine Tool (Automatic Lathe). Guy C. Worrell, Westfield, Mass., assigned to Charles F. Ely, Westfield, Mass. Patent 2,110,568.

Roller Polishing Machine. Joseph R. Keller, Bridgeport, Conn., assigned to The Black Rock Mfg. Co., Bridgeport, Conn. Patent 2,119,862.

Finishing and Polishing Machine. Carl J. Lippold, Wauwatosa, Wis., assigned to J. M. Nash Co., Milwaukee, Wis. Patent 2,119,954.

Air-O-Matic Spot Welder. Edward G. Biederman, Detroit, Mich., assigned to General Motors Corp., Detroit, Mich. Patent 2,120,141.

Spring Winding Machine. Elmer W. Halvorsen and Arthur C. Nigro, Torrington, Conn., assigned to The Torrington Mfg. Co., Torrington, Conn. Patent 2,120,146.

Grinding Machine. John Y. Blazek and Russell G. Anderson, Maple Heights, Ohio, assigned to Lempco Products, Inc., Bedford, Ohio. Patent 2,120,198.

Parts and Mechanisms

Bolt or Pin and Retaining Member. Harry G. Brokering, Dayton, Ohio. Patent 2,119,520.

Method of Measuring and Packing Press Articles and Press Attachment Used Therein. William Ross Smith, Portland, Ore., assigned to American Can Co., New York, N. Y. Patent 2,119,561.

Feeding Apparatus. Cutler D. Knowlton, Beverly, Mass., assigned to Hoague-

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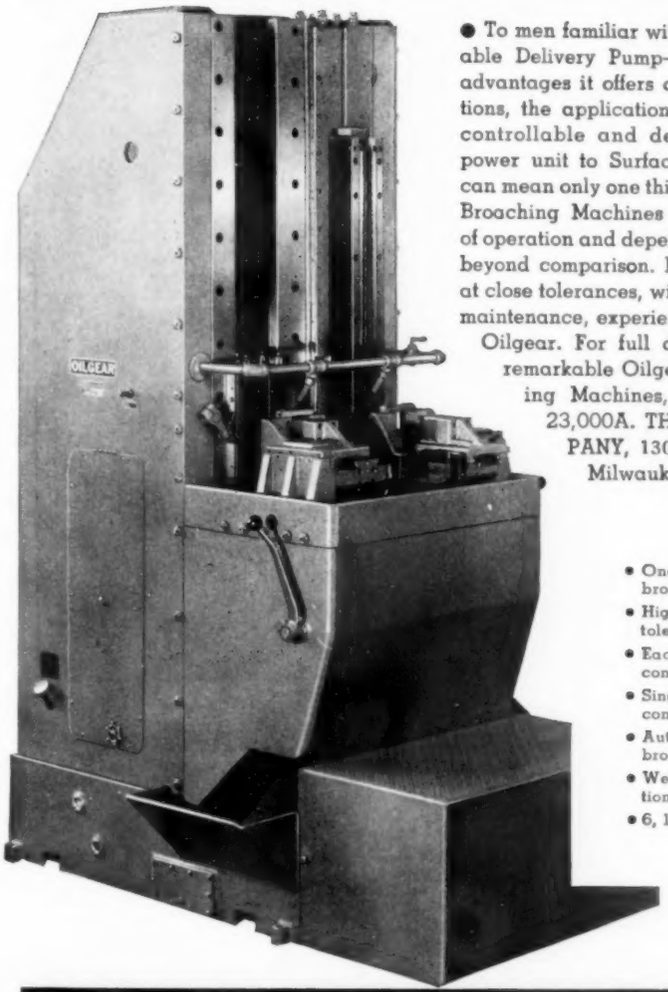

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Sprague Corp., Lynn, Mass. Patent 2,119,585.

Work Feeding Apparatus. William Cameron, Chicago, Ill., assigned to Cameron Can Machinery Co., Chicago, Ill. Patent 2,119,665.

Shaft Coupling. Walter Lindner, Munich, Germany. Patent 2,119,678.

Backlash Eliminator Mechanism. Charles B. De Vlieg, Detroit, Mich., assigned to Associated Patents, Inc. Patent 2,119,705.

Machine Tool Transmission and Control Mechanism. Louis H. Blood, Cincinnati, Ohio, assigned to The Cincinnati Milling Machine Co., Cincinnati, Ohio. Patent 2,119,902.

Spindle Cutter. Albert C. Schmitt, St. Nazianz, Wis. Patent 2,119,929.

Chaser-Holder for Thread-Cutting Tools. Albert F. Breitenstein, New Haven, Conn., assigned to The Geometric Tool Co., New Haven, Conn. Patent 2,119,984.

Tapping Apparatus. Harry W. Ribble, Milwaukee, Wis., assigned to Premier-Pabst Corp., Milwaukee, Wis. Patent 2,120,001.

Feeding and Transfer Mechanism. William W. Criley, Cleveland, Ohio, assigned to The Ajax Mfg. Co., Euclid, Ohio. Patent 2,120,022.

Clutch. John H. Doran, Scotia, N. Y., assigned to General Electric Co., Schenectady, N. Y. Patent 2,120,092.

Axial Thrust Ball Bearing. Georg Schildgen and Georg Wehr, Schweinfurt, Germany. Patent 2,120,154.

Pneumatic Flexible Coupling. Rufus H. Limpp, King City, Mo. Patent 2,120,182.

Hydraulic Contouring Attachment for Machine Tools. Leigh W. Wright, Norwood, Ohio, assigned to The Cincinnati Milling Machine Co., Cincinnati, Ohio. Patent 2,120,196.

Processes

Pipe Bending Method and Apparatus. Louis Carl, Brooklyn, N. Y. Patent 2,119,875.

Manufacture of Bearings. John Bate, Alperton, England, assigned to The Glacier Metal Co., Ltd., Alperton, England. Patent 2,119,900.

Tools and Accessories

Roller Grip Wrench. Elmer C. Freber, St. Louis, Mo., assigned one-half to Joseph L. Eille, St. Louis, Mo. Patent 2,119,622.

Device for Verifying the Speed of Rotating Shafts. Peter P. Kriek, Enka, N. C., assigned to American Enka Corp., Enka, N. C. Patent 2,119,627.

Drill Grinding Tool. William H. Fischer, Jersey City, N. J. Patent 2,119,741.

Grinding Plate. Davis S. Anthony, San Antonio, Tex. Patent 2,119,768.

Power Wrench. Ernest H. Shaff, Grand Haven, Mich., assigned to William H. Keller, Inc., Grand Haven, Mich. Patent 2,119,968.

Die. Christian A. Cadenbach, St. Louis, Mo., assigned to Independent Die & Supply Co., St. Louis, Mo. Patent 2,119,985.

Tube Flaring Device. Tideman M. Lilleberg, Chicago, Ill., assigned to The Nye Tool and Machine Works, Chicago, Ill. Patent 2,120,029.

Broach. Walter S. Praeg, Detroit, Mich., assigned to National Broach & Machine Co., Detroit, Mich. Patent 2,120,041.

Bearing Reamer. Joseph Sunnen, Kirkwood, Mo. Patent 2,120,080.

Apparatus for Making Sinks (Die). Vincent J. Graf, Detroit, Mich., assigned to Briggs Mfg. Co., Detroit, Mich. Patent 2,120,094.

June 14, 1938

Metal-Working Machinery

Die Casting Apparatus. Kaname Kubo, Mitaka-mura, Kitatama-gun, Tokyo, Japan, assigned to Nihon Magnesium Kabushiki Kaisha, Tokyo, Japan. Patent 3,120,333.

Press (Double Action). Rudolph W. Glasner, Chicago, Ill. Patent 2,120,356.

Materials Testing Apparatus. George E. Troxell, Berkeley, Calif., assigned to Baldwin-Southwark Corp., Philadelphia, Pa. Patent 2,120,381.

Drawing Press. Rudolph W. Glasner, Chicago, Ill. Patent 2,120,402.

Machine for Making Capped Nut Blanks. Heyman Rosenberg, New York, N. Y. Patent 2,120,649.

Machine for Making Capped Nuts from Thimbles. Heyman Rosenberg, New York, N. Y. Patent 2,120,650.

Parts and Mechanisms

Pulley. Harry C. Watson, Chicago, Ill., assigned to American Electric Fusion Corp., Chicago, Ill. Patent 2,120,383.

Control for Boring Machines. Lawrence F. Blaash and Charles H. Hardies, Los Angeles, Calif., assigned to Baash-Ross Tool Co., Los Angeles, Calif. Patent 2,120,386.

Chaser Assembly. Frederic Nell, Waynesboro, Pa., assigned to Landis Machine Co., Waynesboro, Pa. Patent 2,120,621.

Feed Mechanism for Screw and Similar Machines. Charles A. Rich, Providence, R. I., assigned to Brown & Sharpe Mfg. Co., Providence, R. I. Patent 2,120,842.

Sanding and Polishing Attachment for Lathes. William F. Yung, Kinsley, Kans. Patent 2,120,880.

Abrading and Cutting Apparatus. Herbert L. Brump and Alvan R. Lambert, Dayton, Ohio, said Brump assigning to said Lambert. Patent 2,120,928.

Processes

Metal Pickling. Charles H. Grant, Horsham, Pa. Patent 2,120,276.

Method of Shaping Sheet Material. Enoch T. Ferngren, Toledo, Ohio, as-

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signed to Plax Corp., Hartford, Conn. Patent 2,120,328.

Method of Cleaning Metal Articles. Floyd M. Hauger, Chicago, Ill., assigned to Keystone Steel & Wire Co., Peoria, Ill. Patent 2,120,494.

Method of Making Roller Bearings. Vivian Earle Tillson, L'Anse, Mich., assigned to Tillson Bearing Corp., L'Anse, Mich. Patent 2,120,533.

Tools and Accessories

Reciprocating Machine Tool (Sander). Eural Wade Taylor, Arp, Tex. Patent 2,120,300.

Inching Machine (Pipe Bender). Harley T. Wheeler, Dallas, Tex. Patent 2,120,-304.

Boring Tool. Carl J. Oxford, Detroit, and John Nelson, Berkeley, Mich., assigned to National Twist Drill & Tool Co., Detroit, Mich. Patent 2,120,622.

Rotary Tool (for backfacing). Carl J. Oxford, Detroit, and John Nelson, Berkeley, Mich., assigned to National Twist Drill & Tool Co., Detroit, Mich. Patent 2,120,623.

Boring Head. Jean R. Yotta, Los Angeles, Calif. Patent 2,120,638.

Arbor Attachment for Lathes. Harold Henwood, Centerville, Ind. Patent 2,-120,782.

June 21, 1938

Metal-Working Machinery

Cutting Machine. George T. Balfe, Detroit, Mich., assigned to Detroit Gasket & Mfg. Co., Detroit, Mich. Patent 2,121,003.

Lapping Machine. Walter F. Egger, Lakewood, Ohio, assigned to The A. P. Schraner Co., Cleveland, Ohio. Patent 2,121,025.

Circular Saw. James G. Collins, Kalamazoo, Mich., assigned to Atlas Press Co., Kalamazoo, Mich. Patent 2,121,069.

Machine for Finishing Gears. Robert S. Drummond, Detroit, Mich. Patent 2,121,479.

Parts and Mechanisms

Material Handling Apparatus for Machine Operations. Max J. Clark, Pontiac, Mich. Patent 2,120,966.

Hydraulic Hoist. Charles G. Eisenberg, Jr., Wauwatosa, Wis., assigned to The Heil Co., Milwaukee, Wis. Patent 2,120,-967.

Flexible Coupling. Milton B. Anderson and Carl E. Swenson, Rockford, Ill., assigned to Borg-Warner Corp., Chicago, Ill. Patent 2,121,066.

Clutch Mechanism. Clarence M. Eason, Waukesha, Wis., assigned to Industrial Clutch Co., Waukesha, Wis. Patent 2,121,075.

Ratchet Gear Mechanism. David Deane Panabaker, St. Mary's, Ontario, Can. Patent 2,121,405.

Cotter Pin (Retainer). George T. Cooke, Norwalk, Conn., assigned to American Railway Products Co., Inc., Darien, Conn. Patent 2,121,425.

Universal Coupling. Alexander Petrus Antonius Ten Broek, Kediri, Java, Dutch East Indies. Patent 2,121,455.

Flexible Shaft Coupling. Merton W. Morgan, Baltimore, Md., assigned to Poole Foundry & Machine Co., Baltimore, Md. Patent 2,121,507.

Braking Device. George H. Fuehrer, Phillipsburg, N. J., assigned to Ingersoll-Rand Co., Jersey City, N. J. Patent 2,121,563.

Clutch Engaging and Disengaging Mechanism. Edward Degelman, Secaucus, N. J. Patent 2,121,626.

Butt Welding Device for Metal Strips. Edwin B. Hudson, Middletown, Ohio, assigned to The American Rolling Mill Co., Middletown, Ohio. Patent 2,121,665.

Work Supporting and Rotating Mechanism. Albert C. Belden, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,121,726.

Sizing Apparatus for Internal Grinding Machines. Raymond A. Cole, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,121,729.

Grinding Machine—Work Loading and Driving Mechanism. Raymond A. Cole, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,121,730.

Cutting-Off Wheel. Duane E. Webster, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,121,751.

Processes

Method of Cutting Material. George T. Balfe, Detroit, Mich., assigned to Detroit Gasket & Mfg. Co., Detroit, Mich. Patent 2,121,004.

Method for Coppering Seamless Tubes. Matthaus Braun, Frankfort-on-Main, Germany. Patent 2,121,393.

Method of Manufacturing Threading Dies. Oscar E. Koebler, Greenfield, Mass., assigned to Greenfield Tap and Die Corp., Greenfield, Mass. Patent 2,121,435.

Tools and Accessories

Pneumatic Tool (Hammer). Elmer J. Seiden, Jackson, Mich. Patent 2,120,992.

Clamp. Alfred F. Krumholz, Chicago, Ill. Patent 2,121,085.

Screw Extractor. Elmer F. Jackman, Lakewood, Ohio, assigned to The Ridge Tool Co., Elyria, North Ridgeville, Ohio. Patent 2,121,197.

Sheet Metal Shears. Ray O. Hooker, Fairmont, Calif. Patent 2,121,247.

Bottoming Tap. Russell F. Bath, Shrewsbury, Mass., assigned to John Bath & Co., Worcester, Mass. Patent 2,121,380.

Grinding Wheel. John F. Fischer, Drexel Hill, Pa., assigned to Abrasive Co., Philadelphia, Pa. Patent 2,121,656.

Peening Tool. Augustine T. Rochte, Tiffin, Ohio. Patent 2,121,660.

Sheet Metal Cutter. Joseph A. Bassett, North Fork, Nev. Patent 2,121,681.

Blowtorch and Attachments. Carl C. Boyd, Rock Island, Ill. Patent 2,121,728.

Composite Abrasive Wheel. Baalis Sanford, Worcester, Mass., assigned to Norton Co., Worcester, Mass. Patent 2,121,746.

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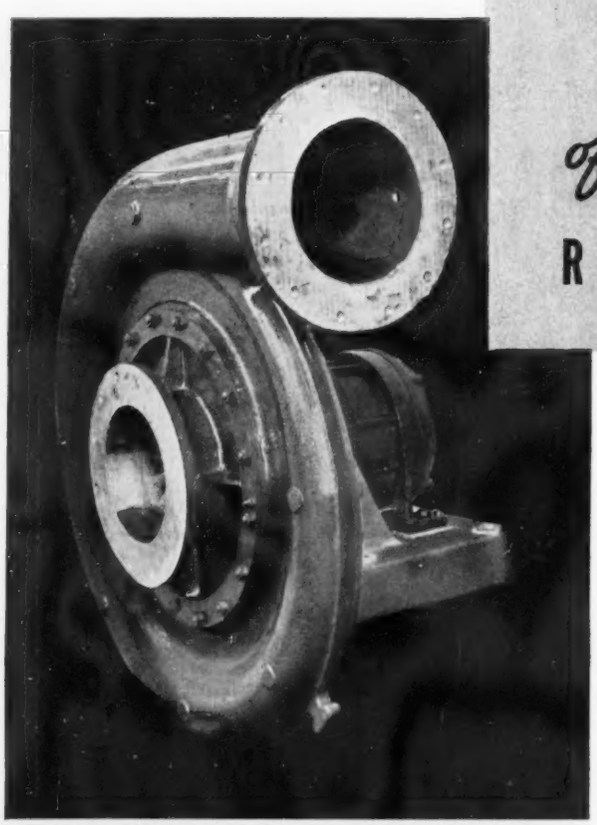

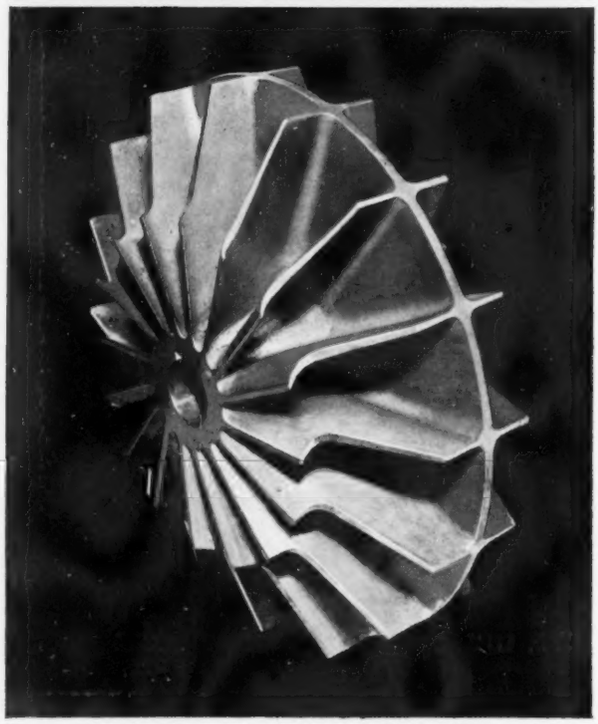

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